Southern Power & Industry

The Industrial and Power Journal of the Southwest

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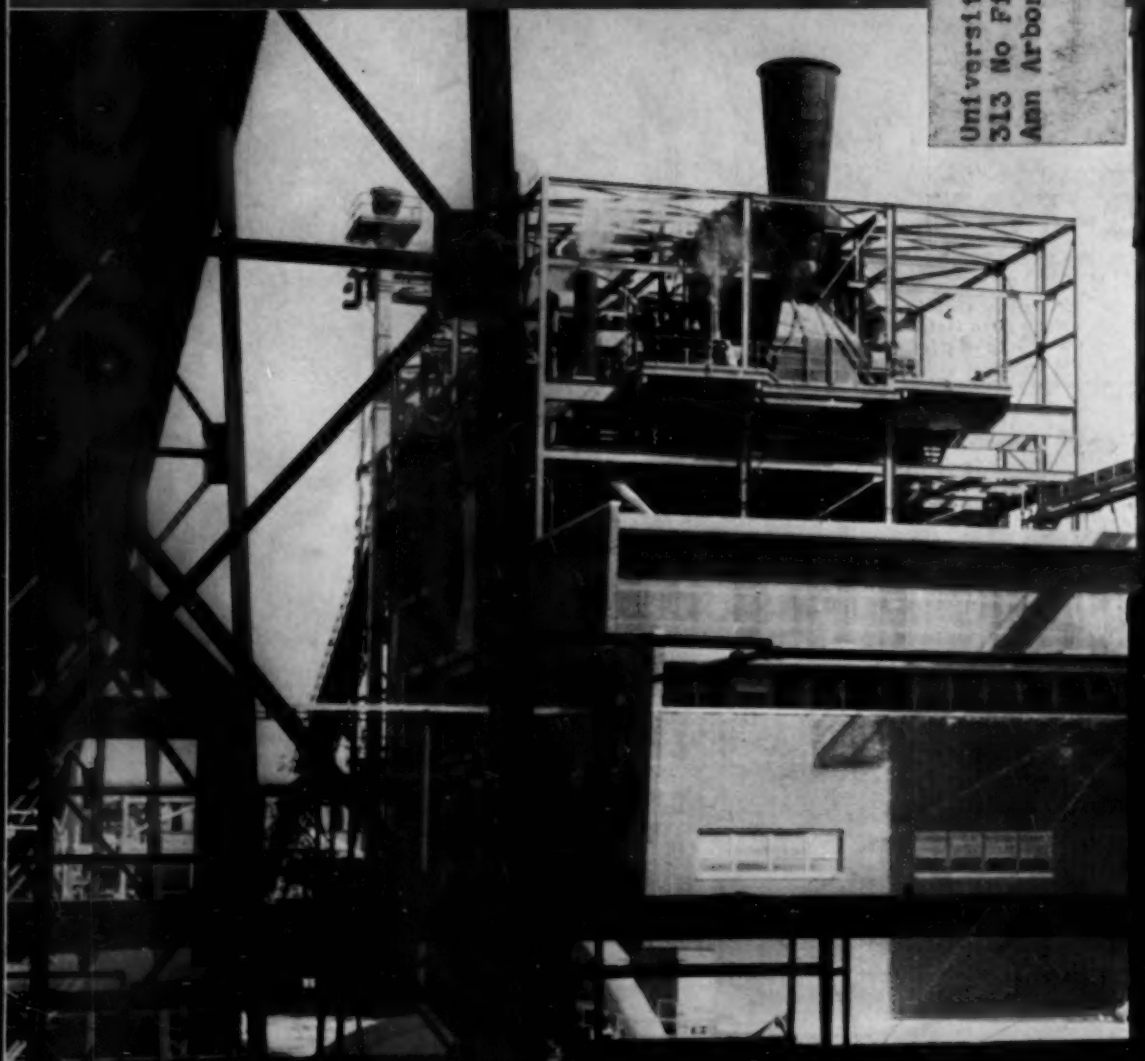
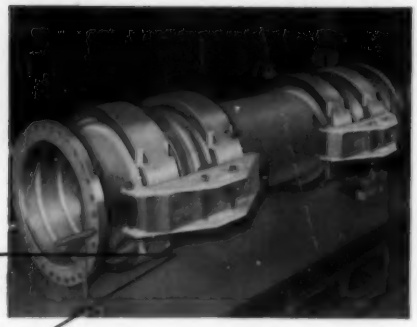


JUNE, 1958

Plant Services . . .

Gulf States Paper's New Mill — Page 40

ALL IN A DAY'S WORK at *Pittsburgh Piping*



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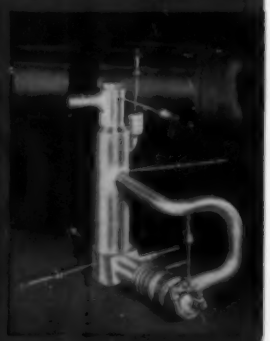
36" carbon steel joint, weighing ten tons, for cross-over piping in central station.

and this small PRESSURE RISER CONDENSER



Pressure riser condenser, 6" Sch. 40 of Stainless Steel Type 347; 2 four bolt mitre joints equivalent to 4" Schedule 160S. Stainless steel pressure vessel, for atomic energy application, appears in background.

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Volume 76 Number 6

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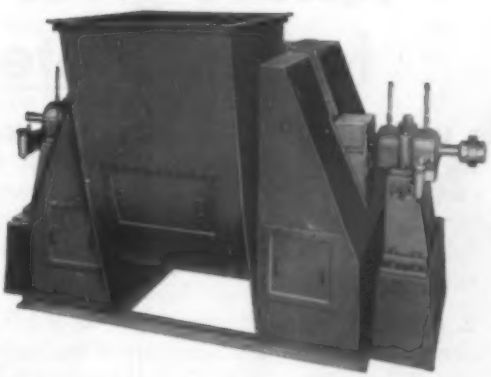

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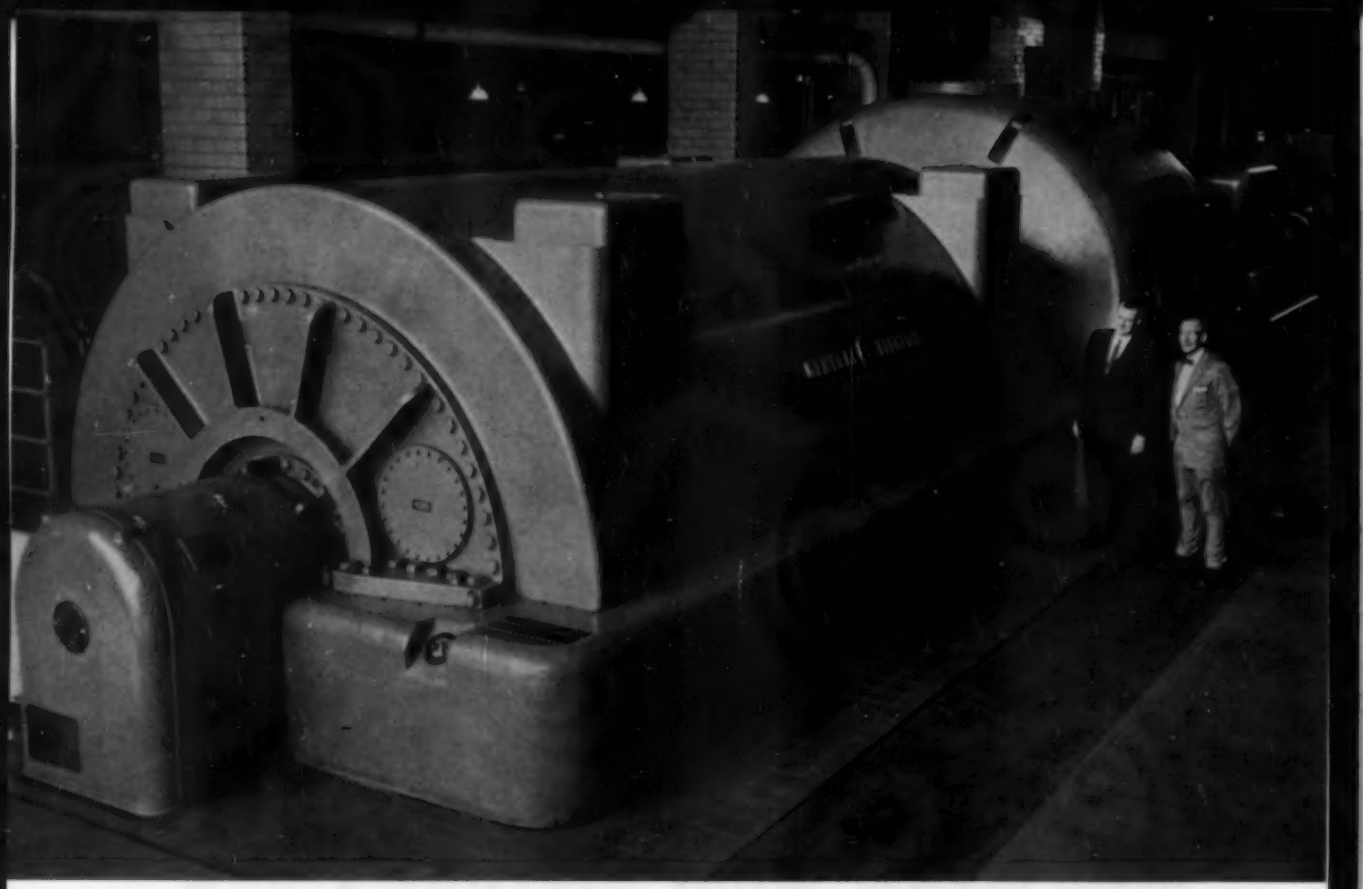

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Southern Power & Industry

The Industrial and Power Journal of the South and Southwest

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No. 6

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Facts and Trends

June 2, 1958

- ALL OF US ARE SALESMEN and reports are the best tools for selling ourselves. SPI can't make you eagerly anticipate your next report but pages 28-30 can help you write a better one.

- GOT ANY UNNEEDED EMPLOYEES? What if your department was the dumping ground for an individual who had worn out his welcome in another department. You don't need him and you are told that for certain high level reasons a job had to be found on your payroll. Worst of all, he was on the executive roll and draws $15,000 a year — substantially more than you make.

  How you can handle a situation such as this can demonstrate effectively your readiness for the next step upward. For constructive suggestions, check Management Clinic on page 24.

- PLANNED MAINTENANCE will pay off and charts from a Florida mill on page 32 show you how. The maintenance and cost control system at Hudson Pulp & Paper Corporation was initiated in April, 1957. Bert Carson, Maintenance Planner, reports on how maintenance costs were greatly reduced and production was increased.

- THE ATOMIC SOUTH has been a pioneer in nuclear engineering education and current expansion of atomic industries offers a firm basis for most optimistic predictions for the future.

  Highlights of the new industry, reported on pages 6-16, feature the new $12 million testing reactor for the Wadesboro-Rockingham area of North Carolina. Industrial Testing Reactors' unit, scheduled for operation in April, 1960, will be the nation's largest privately owned nuclear reactor.

- WHAT IT TAKES — While operating figures have not yet been established at Gulf States Paper Company's ultra-modern pulp mill at Demopolis, Alabama, one ton of pulp will probably require 2 cords of wood, 24,000 lb of steam, 60,000 gal of water, 600 kwh of electricity plus considerable quantities of lime, soda ash, sodium chlorate, sulphuric acid and other chemicals.

  Most unusual feature is the continuous operation of the digester as contrasted with most mills that operate on a batch process. Continuity of the process has contributed to unusually thorough mechanization of the entire manufacturing procedure.

  Plant services are highlighted on pages 40-46. As in all chemical processes, power, steam and water are important. At normal full operation the plant requires 7500 kwh per hour, 18,000,000 gallons of water per day and 300,000 lb of process steam per hour.

- COMING IN JULY — SPI's 3rd Annual MATERIALS HANDLING Issue featuring plant-tested case studies showing how specifc Southern & Southwestern plants have conserved manpower, increased production and more profitably used plant facilities with modern materials handling equipment.

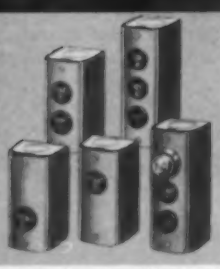
NOW! . . . a selector switch that can be changed from 2-POSITION to 3-POSITION (or vice versa) . . . in 30 seconds!

2 switches in one!

You can't beat this new A-B Bulletin 800 standard duty selector switch for convenience. One unit satisfies both 2-position and 3-position requirements. For changeover, simply loosen two screws, rotate the metal plate through 90°, and retighten the screws . . . that's all!

Also . . . Standard Duty Push Buttons

Like the selector switch above, these push buttons have their contact mechanism in the wrap-around cover. Remove the cover and the terminals in the base are completely exposed for *faster, easier* wiring. One, two, or three buttons (or pilot light).



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ATOMIC South — New Industry Emerges

WITH OPERATION scheduled for April, 1960, **Industrial Testing Reactors, Inc.,** is now constructing a new $12 million nuclear reactor in the Wadesboro-Rockingham area of North Carolina. It will employ about 500 and will attract a large complex of industry into the area.

At Lynchburg, Virginia the **Babcock & Wilcox Company** reports that sustained nuclear fission has already been achieved in an experimental reactor built as an aid in developing the nuclear propulsion system for the NS Savannah.

Oak Ridge National Laboratory now has six nuclear reactors in operation. Latest is a $5 million unit used for engineering studies on the effect of nuclear radiations on reactor materials.

The **Carolinas Virginia Nuclear Power Association** is building a 17,000 kw nuclear plant at Parr Shoals, S. C. (See SPI for Feb., p. 68-70). Florida developments include a proposed 50,000 kw atomic plant by the East Central-Florida West Coast Groups. It is to be the prototype of an eventual 200,000 kw plant.

By JOHN F. LEE
SPI Consultant on Atomics and Professor of Mechanical Engineering North Carolina State College

THESE DEVELOPMENTS have moved so swiftly in the South that some well informed persons estimate that it will become one of the South's most important industries in the next ten years.

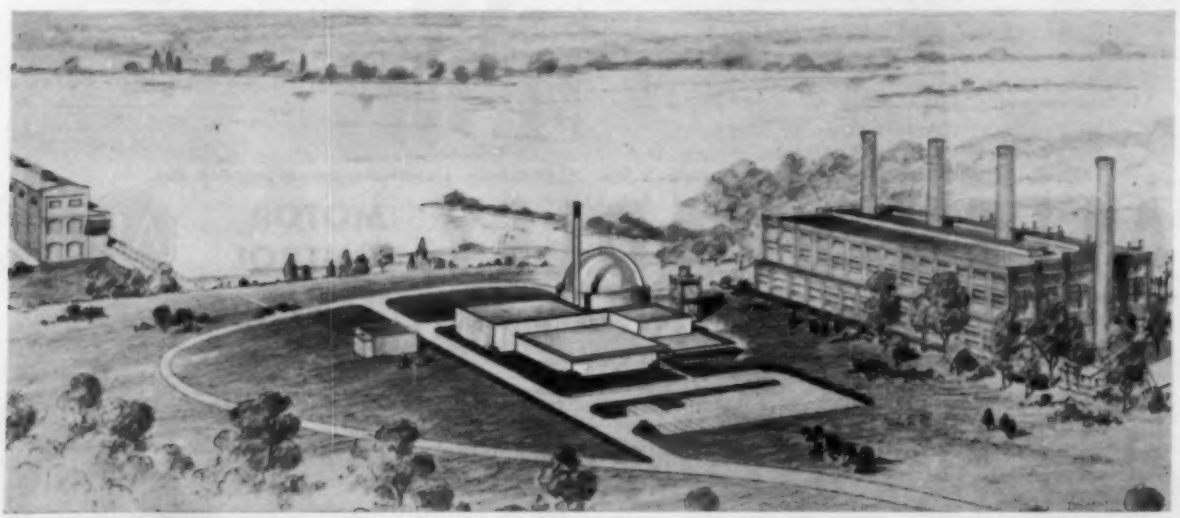
This is quite a bold prediction but one must respect it when the recent expansion of atomic industries in this part of the country is taken into consideration. Also when one realizes that the South has been a pioneer in nuclear engineering education, there is a clear explanation for the present atomic developments and a firm basis for optimistic predictions for the future.

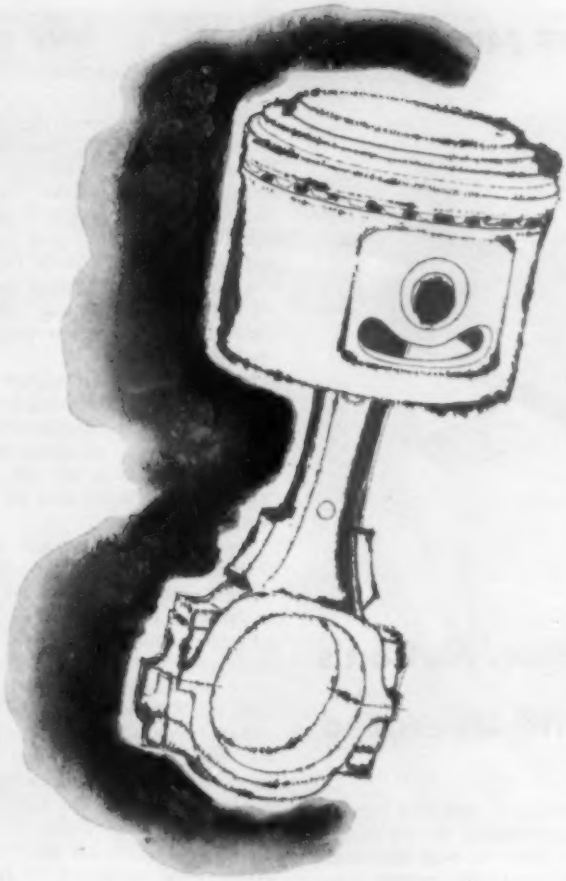
Scientific and engineering education must usually precede the industrialization of any area. One can trace a very definite relationship between industrial development and scientific educational opportunities in all parts of the world.

We now have a good example of the relationship between educational leadership in nuclear engineering in the South and the emergence of a new and important industry. Each of us must now ask ourselves how many other opportunities we are missing.

The answer can be found by an objective appraisal of the state-supported engineering schools in our states. How good are their faculties? How good are their graduates? How well do our engineering schools *really* compare with the best in other states? Are they as good as the state - supported engineering schools in California, Michigan,

Nuclear power plant planned to be built about 25 miles north of Columbia, S. C., by Carolinas Virginia Nuclear Power Associates Inc. The reactor is between a hydro plant and a steam plant now producing power by conventional means.





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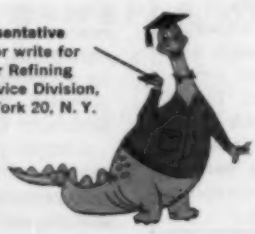
Call your Sinclair Representative for further information or write for free literature to Sinclair Refining Company, Technical Service Division, 600 Fifth Avenue, New York 20, N. Y. There's no obligation.



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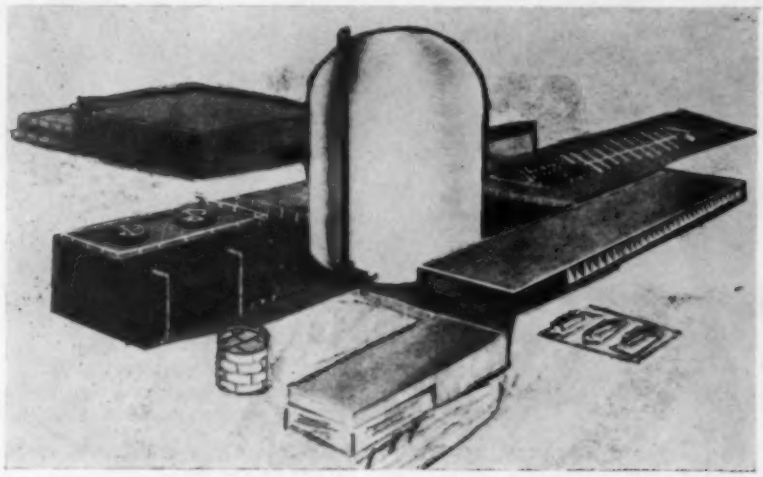


$12 Million Carolina Reactor Nation's Largest Privately Owned and Operated

Wisconsin, Illinois, and many other states? When we have answered these questions honestly, we shall know in what measure we have prepared to develop our industrial potential.

New Carolina Reactor — The nation's largest privately owned nuclear testing reactor is to be in the Wadesboro - Rockingham area of North Carolina. **Industrial Testing Reactors, Inc.,** a newly formed North Carolina firm, will build the nuclear testing plant at a cost of $12,000,000. Construction will begin this summer and the plant is expected to be in operation by April 1, 1960. The plant will employ about 500 people with an annual payroll in excess of $1,000,000. It is expected that the reactor will attract a large complex of industry into the surrounding area.

Edwin L. Jones, President of J. A. Jones Construction Company of Charlotte, N. C., is a part owner of the reactor test facility and his firm will be the general contractor for the project. The reactor will be built by General Electric Company and Ralph M. Parsons Co. of Los Angeles are the consulting engineers. Jones said that although the facility is expected to cost $12,000,000, an additional $8,000,000 will be invested in peripheral facilities by companies using the reactor.

The test reactor is the first privately owned and operated facility of its kind anywhere in the world. It will be used to test materials and fuel elements for power reactors. In addition, the reactor will serve as a research tool for probing into the possible further uses of nuclear energy.

The related industries expected to use the reactor, and likely to be drawn into its orbit, include metallurgy and alloy research, pharmaceutical chemistry, chemical plants involving atomic processes and by-products, missile fuels, missile design and testing, development of new nuclear irradiated plastics and structural materials, and food preservation.

In addition to the reactor facility, there will be five auxiliary facilities including a radioactive materials laboratory, an equipment and mock-up building, an office building, a cooling tower and an elevated water tank.

Mr. Jones, when asked why the Wadesboro - Rockingham site was chosen, responded that "it is hard to believe that we could locate a site that would have all the advantages this one does. Many sites were examined. We had to stay near industry because industry must use it. It had to be near universities and it is." The site is only 85 miles from North Carolina's Research Triangle comprising the University of North Carolina, Duke University, and North Carolina State College. Jones went on to say "it had to be in an isolated spot but near good towns for its staff."

Lynchburg Reactor — The Babcock & Wilcox Company reported that criticality, or sustained nuclear fission, has already been achieved in an experimental reactor built near Lynchburg, Virginia, as an aid in developing the nuclear propulsion system for the NS Savannah, world's first atomic merchant ship. Spokesman for Babcock & Wilcox, prime contractor for the vessel's propulsion plant, said the reactor start up was "right in line" with the ship's design and construction timetable.

The test unit stands in a specially constructed bay of the critical experiment laboratory in Lynchburg. It is equipped with numerous automatic safety controls. Among them is an interlock which shuts down the reactor immediately if personnel attempt to enter the test bay. Close observation of the fissioning reactor at other points of the laboratory is made possible, however, by a closed-circuit television system supplied by the Diamond Power Specialty Corporation.

Company officials said that the reactor will be operated during the next several months to check analytical calculations made in the

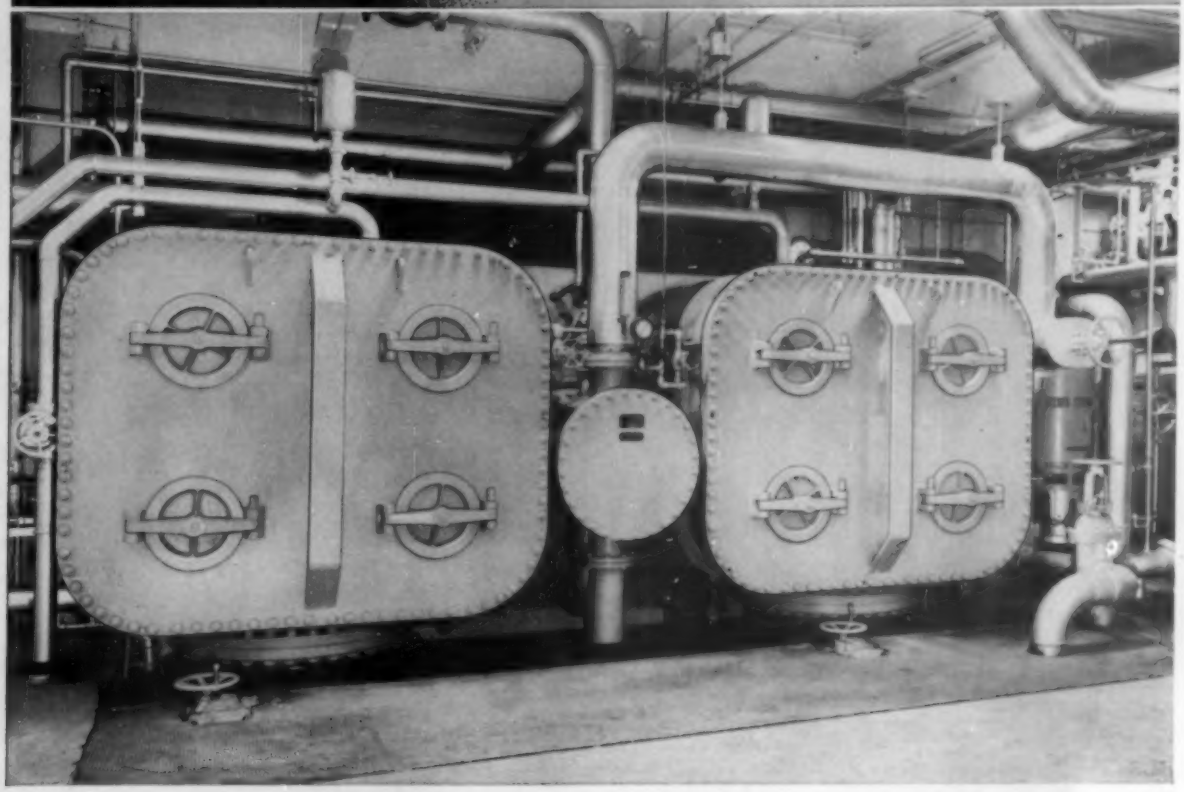
Hens AND Eggs

A disturbing matter in connection with the industrialization of the South has been the annual loss of our best scientific minds to other areas of the nation. Fortunately, nearly all of the graduates in engineering and science prefer to remain in the South. But, unfortunately, the opportunities have been somewhat limited.

We then have the unending debate on whether the hen or the egg is to come first.

The hens AND the eggs must be provided simultaneously to insure the future outcome. Superior technical education, research and industry must be nurtured simultaneously for the future to be safe in a world in which technology is the mother of industry and where technology is becoming increasingly more complex.

PROGRESS IN POWER through PROGRESS IN HEAT TRANSFER EQUIPMENT



NEW-DESIGN CONDENSERS SAVE SPACE AND MONEY

Steam generation of electricity has made tremendous progress in the last 25 years because of the ever-increasing efficiency of the equipment used.

A power equipment manufacturer with many "firsts" to its credit, Yuba is continually designing, among other equipment, condensers with low head room to save much-needed space. This advancement is illustrated above in the photograph of a rectangular shape condenser for the Suwanee River Plant of the Florida Power Corp.

A low pressure heater is installed between the tube banks to further save plant space, as well as initial cost for foundation and piping. An additional design feature of Yuba condensers is a de-aerating section within the condenser shell which eliminates the main plant de-aerating heater. Maintenance and downtime costs are reduced by welding tubes into tube sheets.

For advanced condenser design, that will save space and money, consult the Yuba Heat Transfer Division, formerly the Heat Exchanger Division of The Lummus Co.

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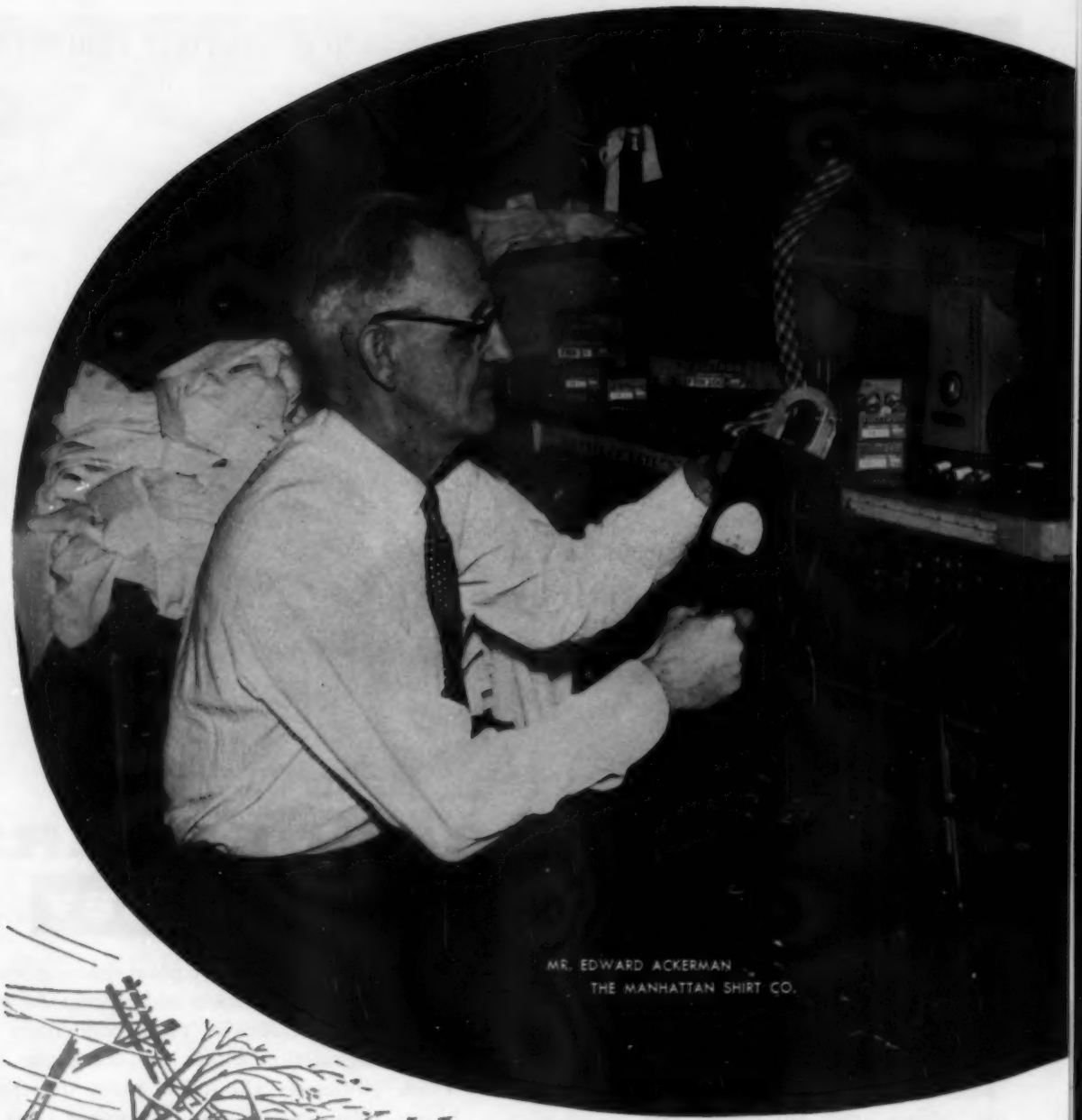


MR. EDWARD ACKERMAN
THE MANHATTAN SHIRT CO.

Fusetron dual-element fuses protected 150 motors against burnout when a hurricane single phased our primary line

MR. EDWARD ACKERMAN
CHIEF ELECTRICIAN-THE MANHATTAN SHIRT CO.
PATERSON, NEW JERSEY

Mr. Ackerman continues . . .

"One afternoon a hurricane struck and single phased the line feeding our plant.

"At the time, all 150 of our sewing machines were in operation. No one suspected the motors were running single phase. Our first warning came when the machines started shutting down through the plant as Fusetron fuses began blowing to protect the motors.

"I had no idea in what condition we would find the motors. It was certainly a relief when we checked and did not find one damaged sewing machine motor. Around 300 Fusetron fuses had blown to protect them.

"You can imagine how costly it would have been to repair or replace these ½ hp., 3 phase, 220 volt motors — and our plant would have been out of business while this work was being done. So we think we paid a very small price when our only expense was replacing the 3-2/10 ampere Fusetron fuses.

"Since this experience, our seven other plants have been informed of the above incident, and it has been suggested to them, that they protect all sewing machine motors with Fusetron dual-element fuses."

Why Fusetron fuses provide safest, simplest way to prevent damage from single phasing.

When single phasing occurs, the current in the remaining phase increases about 100%. (Theoretically 73% but change in efficiency and power factor makes it about 100%.

This 100% overload on Fusetron fuses of motor-running protection size opens them and shuts down the motor.

Such dependable protection against motor burnouts from single phasing has never before been available.

You too, can get maximum electrical protection and save money by installing Fusetron dual-element fuses throughout the plant

With rare exceptions on commercial and industrial installations — ordinary fuses and circuit breakers protect only against short-circuits — but Fusetron dual-element fuses provide 10 point protection.

FOR LOADS ABOVE 600 AMPS. — USE BUSS HI-CAP FUSES TO COORDINATE YOUR ELECTRICAL CIRCUITS.

On 600 volts or less, BUSS Hi-Cap fuses have interrupting capacity sufficient to handle any fault current regardless of system growth.

They can be coordinated with Fusetron fuses on feeder and branch circuits to limit fault outages to circuits of origin.

FOR MORE INFORMATION ASK FOR BULLETIN FIS ON FUSETRON DUAL-ELEMENT FUSES — BULLETIN HCS ON BUSS HI-CAP FUSES.

BUSSMANN MFG. DIVISION
McGraw-Edison Co.
University at Jefferson, St. Louis 7, Mo.

FUSETRON
TRUSTWORTHY MARKS OF ELECTRICAL PROTECTION
BUSS

Play Safe! install FUSETRON dual-element FUSES and BUSS Hi-Cap FUSES throughout entire Electrical System!

course of designing the ship's propulsion plant.

Scheduled for completion in 1960, the Savannah will be powered by an advanced type of pressurized water reactor. The reactor plant will deliver a maximum of 22,000 shaft-horsepower. Estimates of the power plant's capability run as high as 350,000 miles on a single core loading of nuclear fuel.

New Oak Ridge Reactor — A new research reactor of the Atomic Energy Commission at Oak Ridge National Laboratory went critical on March 21. The reactor, designated the Oak Ridge Research Reactor (ORR), is a high flux, tank-type reactor immersed in a pool. It will be used for fundamental research and engineering studies on the effect of nuclear radiations on reactor materials, particularly fuel elements and structural materials.

Major design emphasis was placed on flexibility to permit many kinds of experiments close to the reactor core, and on accessibility to the core for numerous experiments within the high-flux region. The design permits entire fuel systems, rather than single samples, to be brought into the high-flux system.

The ORR is a heterogeneous reactor, moderated and cooled with demineralized water. It is designed to operate at a power level of 20,000 to 30,000 kw of heat with an average flux greater than 1 x 10^{14} neutrons per square centimeter per second. It has a beryllium-reflected core which utilizes enriched uranium fuel elements of uranium-aluminum alloy clad with aluminum.

The reactor core is housed in a tank 15 ft high and 5 ft in diameter which is submerged in a pool 21 ft long by 10 ft wide and 28 ft deep. Access to the core is through penetrations in the concrete walls at one end and the sides, as well as from the top of the reactor and from an adjacent pool.

The chain reaction within the reactor is controlled through four or more vertical rods which are actuated from below the reactor. This gives experimenters easy access to the core from above.

The reactor which cost about $5 million is housed in a building 108 ft long and 60 ft wide located in the Laboratory near the Oak Ridge Graphite Reactor, the world's oldest operating nuclear reactor. With operation of the ORR, Oak Ridge National Laboratory now has six nuclear reactors in operation.

The McPherson Company of Greenville, S. C. performed the detailed design of the reactor. Construction of the building and reactor was performed by Blount Brothers Construction Company of Knoxville, Tenn. Oak Ridge National Laboratory furnished the preliminary design, design criteria, and installed the nuclear portions of the reactor. The Laboratory is operated for the Community Union Carbide Corporation.

Florida Nuclear Activities — In addition to ambitious reactor and nuclear engineering programs at both the University of Florida and Florida State University, industry in Florida is fully aware of the potentialities of nuclear energy. A proposal for a 50,000 kw atomic power plant has been submitted to the AEC by the East Central-Florida West Coast Groups.

The proposed plant will be a prototype of an eventual 200,000 kw atomic power plant. The reactor will be a high-temperature, high-pressure, gas-cooled, heavy-water moderated type unique in this country. Design and construction will be done by the American Gas and Electric Service Corporation with General Nuclear Engineering Corporation of Dunedin, Florida as design and project engineers.

South Carolina Plant — The Carolinas Virginia Nuclear Power Associates will build a 17,000 kw nuclear power plant at Parr Shoals, South Carolina. A very complete story on this plant was given in SPI for Feb., p. 68-70. An architectural rendering of the plant is shown to give some concept of its size and scope.

Georgia Nuclear Laboratories to Develop Reactors for Industry

Lockheed Aircraft Corporation's Georgia Division has formed a separate operating branch which is engaged in designing and manufacturing nuclear reactors for the generation of industrial heat.

While process heat reactors "operating at a profit to industry" is the immediate goal, Lockheed's nuclear experts will also design and build specific research and training reactors for universities and will specialize in the field of small portable power packages.

Robert W. Middlewood, formerly chief engineer of the Lockheed Georgia Division, is director of the Georgia Nuclear Laboratories. Manufacturing will be done at the Marietta, Georgia plant of Lockheed, which is the largest and one of the best equipped manufacturing facility in the South.

W. R. Rhoads is manager of operations; **Dr. J. C. Flack**, chief nuclear engineer; **B. A. Martin**, manager of sales; **Dr. M. M. Miller**, nuclear laboratory division engineer; **F. T. Bly**, nuclear projects support manager; **G. W. Craig**, nuclear design manager; **E. W. Hesse**, manager of reactor operations; **R. A. Thompson**, radiation effects manager; and **J. T. Bracken**, nuclear measurements manager.

Lockheed entered the nuclear field eight years ago with a design study contract looking toward the development of a nuclear powered airplane. The Georgia Division is also building the nation's largest nuclear radiation effects test facility at Dawsonville, Georgia. The latter facility is scheduled for operations this fall.

One of the largest . . .

Ford Motor Co.'s Atlanta assembly plant is now one of the largest automobile factories in the world.

Completion of a new 407,000 sq ft addition brings the plant's total work area to more than 1,000,000 sq ft.

RELIABLE VENTILATION IN A PACKAGE

"Buffalo" Belted Vent Sets

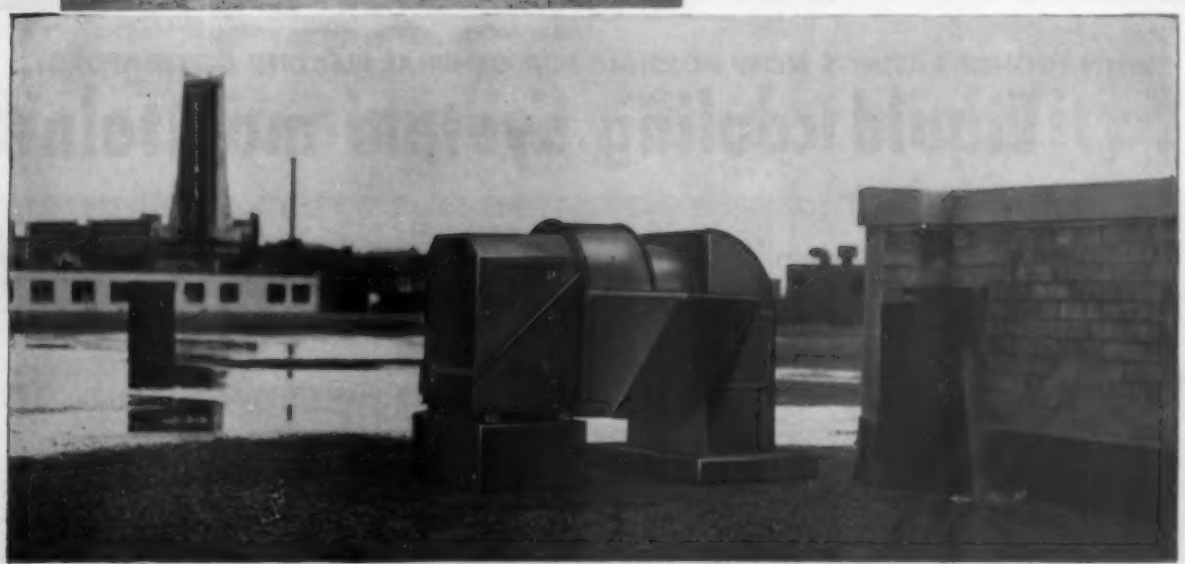
Quiet, ruggedly constructed and compact, "Buffalo" Belted Vent Sets are equally adaptable to indoor or outdoor installations. Double-curved blades prevent overloading. Inlet vane design reduces turbulence and air noise. Insures quiet, stable fan operation, even under unfavorable inlet conditions. Available with all-weather drive cover for roof or other outdoor installations. Capacities range from 500 to 20,000 cfm. Adjustable pitch motor sheaves permit variable capacity.

For full information, write for Bulletin 3720-A.

SPECIAL FEATURES AVAILABLE

All-Weather Cover and Rain Shield. Drain Connection in bottom fan housing. Access Door in scroll. Inlet and Outlet Screens. Non-sparking Aluminum Wheels. Enclosed or Explosion-Proof Motors. Ball Bearing Motors. Anti-Vibration Pads. Stainless Steel or Aluminum Construction for Units having all parts in contact with gas or fumes. Belt Guard. Gravity Type, Hand-Operated or Motor-Operated Outlet Shutters. Special Protective Coatings on Inside Housing and Wheel.

All "Buffalo" products feature the famous "Q" Factor—the built-in Quality that assures trouble-free satisfaction and long life.



VENTILATING
AIR CLEANING
AIR TEMPERING
INDUCED DRAFT

BUFFALO FORGE COMPANY

EXHAUSTING
FORCED DRAFT
COOLING
HEATING
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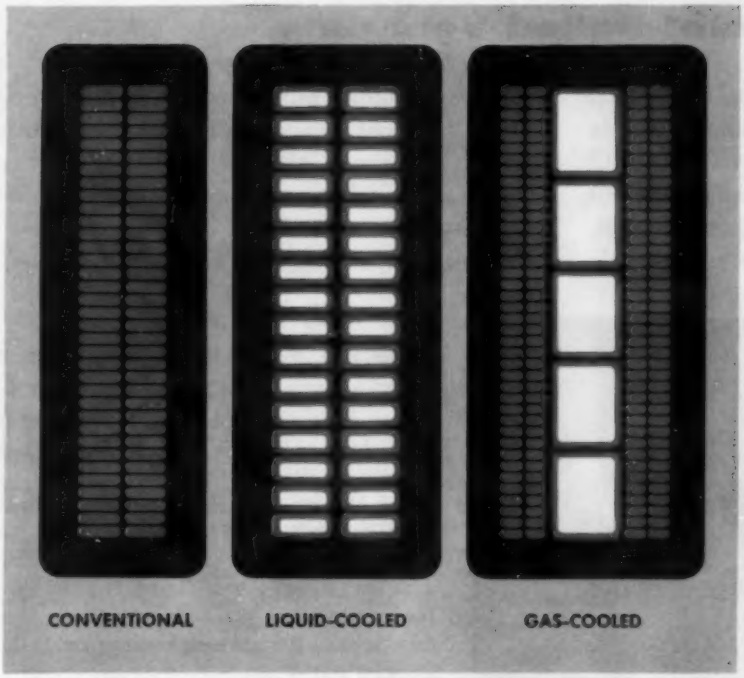
BUFFALO, N. Y.

Buffalo Pumps Division, Buffalo, N. Y.

Canadian Blower & Forge Company, Ltd., Kitchener, Ont.

"Buffalo"

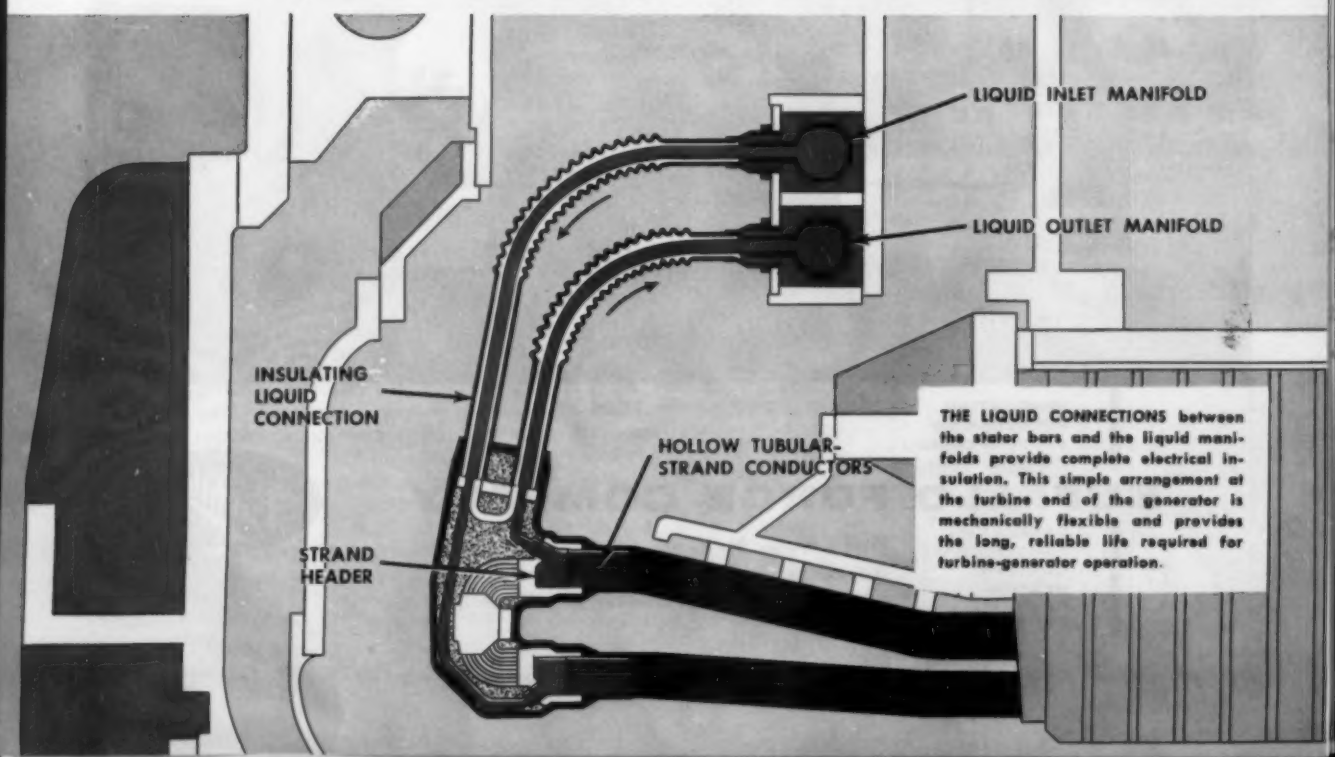


COMPARISONS of three types of stator bars built by General Electric show that dielectric construction of the liquid-cooled bar is as simple as for the conventional bar. Since liquid flows directly through the hollow conductors, no duct insulation is required as in the gas-cooled bar, and heat transfer is considerably improved.

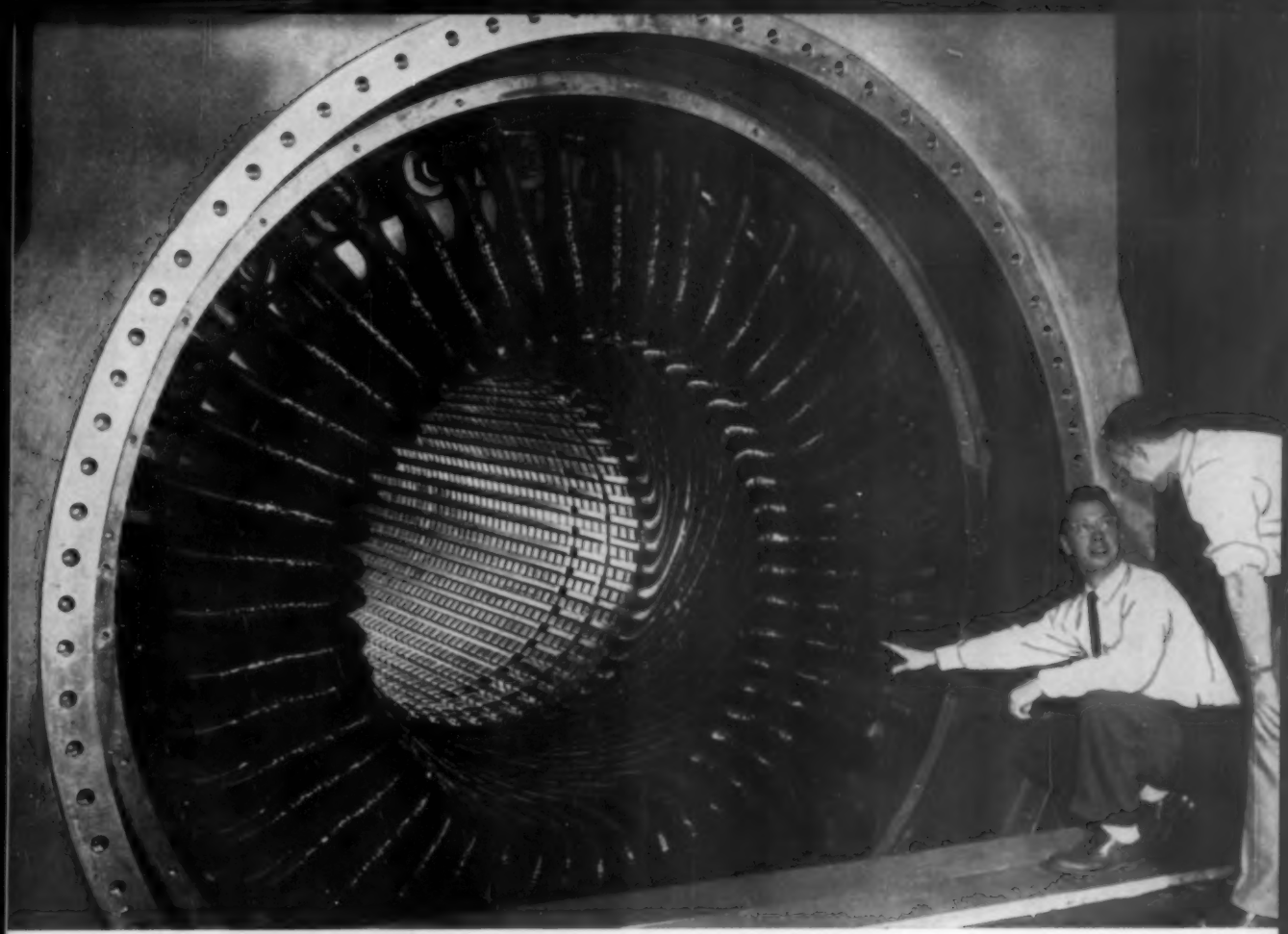
COMPLETELY INSULATED, the liquid connections between the stator bars and the liquid header leave no exposed copper. Note the design simplicity of this turbine end of the generator. The collector end also is extremely simple and has the appearance of conventionally-cooled units.

WITH HIGHER RATINGS NOW POSSIBLE FOR GENERAL ELECTRIC GENERATORS...

Liquid cooling system maintains



THE LIQUID CONNECTIONS between the stator bars and the liquid manifolds provide complete electrical insulation. This simple arrangement at the turbine end of the generator is mechanically flexible and provides the long, reliable life required for turbine-generator operation.



dielectric simplicity and reliability

COMPLETE LINE-TO-NEUTRAL INSULATION ELIMINATES EXPOSED COPPER SURFACES

Despite the tremendous increase in unit output now available with direct liquid cooling of generator stators, the dielectric system remains basically as simple as for conventionally-cooled machines.

Complete insulation of the winding is provided, as in conventional cooling arrangements. Thus, with no exposed copper surfaces, possibility of electrical creepage flashover to ground is practically eliminated.

Within the stator bar, only insulation between strands is required since there are no central cooling ducts to insulate. Not only does this provide more effective utilization of stator slot space and better heat transfer, but it makes possible the simplest dielectric construction of the stator bar.

Dielectric simplicity is just one of the many important features of General Electric liquid-conductor-cooled generators. Other outstanding advantages are:

Increased Generator Output—*Hollow strand stator bar construction can remove up to 16 times more heat than conventional cooling arrangements, permitting higher generator ratings.*

Improved Performance—*Liquid cooling permits automatic regulation of stator winding temperature independent of load.*

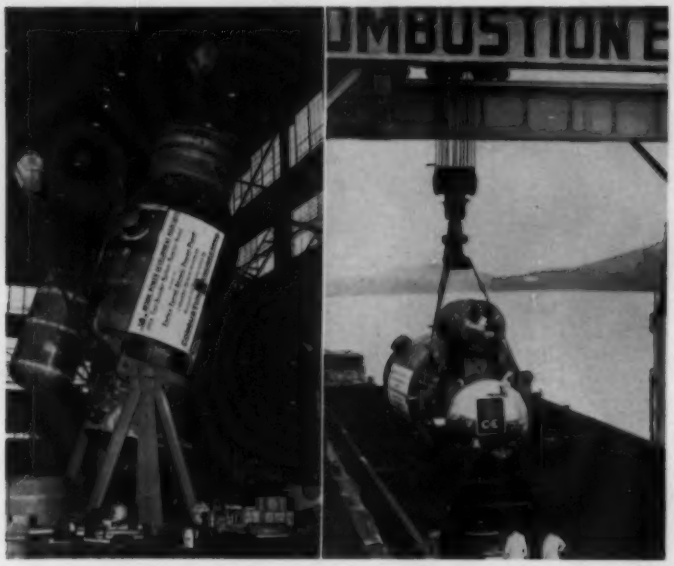
Dependable Operation—*Many unique features are incorporated into the design of the closed coolant system to provide a permanently tight liquid circuit.*

Shorter Maintenance Inspections—*Simple, single-stage, low-pressure hydrogen circulating fans facilitate disassembly and inspection.*

For more information on liquid cooling, contact your nearest Apparatus Sales Office or write to Section 254-75 for bulletin GER-1231, Large Steam Turbine-Generator Department, General Electric Company, Schenectady 5, New York.

Progress Is Our Most Important Product

GENERAL ELECTRIC



C-E's Chattanooga Div. Fabricates Complex 183,000 lb Reactor Vessel

Recently shipped to the Enrico Fermi Atomic Power Plant at Lagoona Beach, Michigan, this huge reactor vessel is the most complex stainless steel pressure vessel of its size ever built. Detailed design and construction were done by Combustion Engineering, Inc., at its Chattanooga, Tennessee Division.

Over 450 tons of stainless steel and 65 tons of carbon steel, plate, bar and forging was ordered for fabrication of the vessel, internal shielding, rotating plug and other structures. Vessel shell is up to 2-in. thick Type 304 stainless steel, Rotating plug cover plate (12-in. thick, 116-in. diameter) is made of carbon steel forging. Every square inch was ultrasonically inspected for flaws.

Manufacturing time was 28 months — on a 3-shift, six-day-week basis.

Total feet of weld in the vessel totals 2,200; in the shielding, rotating plug and miscellaneous structures 5,900. All major welds were radiographed and were tested for flaws by either a dye-penetrant or magnetic-particle test.

Reactor vessel (36 ft high) is made up of four separate cylindrical vessels welded together to form a unit assembly. Design and manufacture were greatly complicated by the eccentric relationships of the components and the severe thermal and nuclear radiation conditions anticipated in operation.

LIQUID WAREHOUSE FACILITY – TENN.

Molasses, liquid fertilizers, chemicals, heavy petroleums, vegetable and animal oils, syrups and some acids are being stored and dispensed from tanks of the **Memphis Mixed Products Terminal Corporation,** President's Island, Memphis 6, Tenn.

Company believes that this "liquid warehousing facility" is the first tank farm operation available to distributors, manufacturers and shippers on a lease basis.

Facility will be used as an accumulation or distribution point or both. Economies are affected because of cheap river transportation and because of economical loading and unloading of barges and tanks. Rail, barge and truck lines services are available right to the tanks. Any Mississippi River barge can be handled.

Average tank to be built will accommodate 600,000 gallons of liquid. Larger and smaller tanks will be built according to the manufacturer's requirements.

Trane Acquires Plant Site — Del.

The Trane Company, manufacturing engineers of air conditioning, heating, ventilating and special heat transfer equipment, has purchased about 43 acres of land in **Harrington, Del.** as a possible future plant location.

Trane has its headquarters and main manufacturing facilities in La Crosse, Wisconsin, with plants in Scranton, Pennsylvania, and a wholly-owned subsidiary in Toronto, Canada. The firm is currently constructing a new plant at Clarksville, Tennessee, for the manufacture of central-type residential air conditioning equipment.

Trane President D. C. Minard said, "While we do not have specific building plans at this time, it is hoped that a plant at Harrington will be needed to serve the eastern market as the demand for some of our newer lines increases."

Tulsa Plant for Barada & Page

August 1 completion is scheduled for the $150,000 masonry office and warehouse building for **Barada and Page Inc.** of Kansas City, Mo. which is being erected on a 3 acre site in **Tulsa, Oklahoma.** Company distributes agricultural and industrial chemicals.

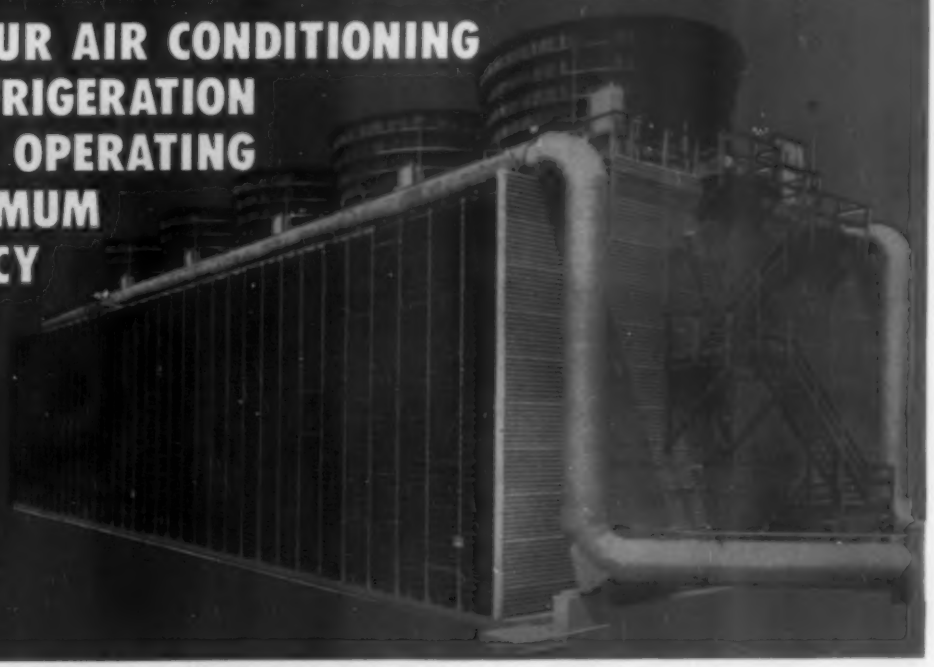
The one-story structure will contain 13,000 sq ft of floor space of which 1,500 sq ft will be for office space.

Hannaford Construction Co. was awarded the contract for construction.

Walter M. Betts is president of the company; **George E. Page,** vice president; and **O. A. Collings,** manager of the Tulsa operation.

During the coming Peak Load months

KEEP YOUR AIR CONDITIONING AND REFRIGERATION SYSTEMS OPERATING AT MAXIMUM EFFICIENCY



Anco water treatment removes rust and scale ...kills slime and algae in your equipment

THE TIME IS AT HAND when refrigeration and air conditioning equipment must be operated longer and with more efficiency. Scale and rust, acting as insulators, will reduce heat transfer and produce high head pressures. Algae and slime in the system will retard circulation and reduce heat dissipation. The proper feeding of correct formulas and a program of continued control by ANCO can correct these conditions.

ANCO SCALE REMOVER, an efficient dry formula, based on DuPont Sulfamic Acid, works while the system is in operation, to dissolve heavy scale formations in a few hours.

ANCO COOLEX is an inexpensive, effective formula to protect all metal surfaces against rust, pitting and scale formation. Maximum efficiency of operation is assured, with a minimum expenditure for upkeep.

ANCO ALGAECIDE kills and removes algae and slime from your cooling water system. This highly effective chemical does the job while your equipment is operating.

Our competent service representatives covering the South offer you a free analysis of your water problems. It will pay you to get this treatment program installed in your plant now. Write for full details. There is no obligation.

SPECIALISTS IN MAKING WATER BEHAVE

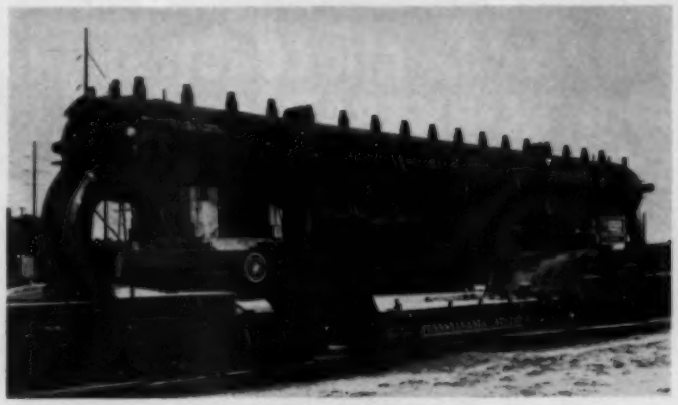
Anderson Chemical Company, INC.

Macon, Ga.: Box 1424 • Phone 5-0466

Memphis, Tenn.: Box 2432, DeSoto Station • Phone: BRoadway 2-2806

New Multi-Million Dacron Plant for Du Pont – Tenn.

The Du Pont Company will build a multi-million dollar plant to produce "Dacron" polyester fiber on a site adjoining its rayon manufacturing unit at **Old Hickory, Tenn.** New unit, an addition to the rayon and cellophane operations at Old Hickory, will be designed for an ultimate production of 56,000,000 lb annually of "Dacron" staple and filament products. Initial production is scheduled for the middle of 1959.



Boiler Drum for Memphis Plant

HERE is the nation's largest freight car carrying a 78 ft long, 403,000 lb boiler drum from The Babcock & Wilcox Company's Barberton Works to the Thos. H. Allen Electric Generating Station in Memphis, Tenn. Maximum speed of the depressed flatcar was limited to 30 mph, while an empty car, or "idler" was placed at each end of the flatcar to avoid weight concentration.

B&W is furnishing 3 radiant, pressurized, reheat type, multiple cyclone steam generators rated at 2,000,000 lb/hr. Total rating of the $121 million plant is 750,000 kw. Equipment highlights were featured in SPI for January '58, page 41.

$3 Million Research Center – Virginia

Marlboro, Virginia (a newly named town just south of Richmond) will be the site of the new $3 million McComas Research Center which **Philip Morris** will build near its 100,000 sq ft factory warehouse now under construction.

New Texas Corrugated Box Plant for Continental Can

Continental Can Company has awarded a contract for construction of a corrugated box plant in **Tyler, Texas** to the Clanahan Construction Company of Tyler.

Construction began in April and the plant is scheduled to be ready for operation July 31. The modern plant, which will be on a 40 acre site, was designed by Continental's Construction Engineering Division. The building will initially comprise 45,000 sq ft and has been planned in such a way that it can readily be enlarged. Two of the outside walls will be sidings that can be taken down for economical expansion. Transportation facilities will comprise a rail line as well as the plant's own truck fleet for maximum flexibility of distribution.

The plant will be equipped for the manufacture of a complete line of corrugated boxes from corrugated sheets which will be supplied by the Company's Jackson, Mississippi corrugated box plant. A corrugator will be added at a future date.

This will be the sixteenth corrugated box plant operated by Continental domestically and will bring the total number of Continental plants to 140. The company is the leading manufacturer in the packaging industry and produces most of the major types of containers.

How Cincinnati Plant Stops Valve Maintenance Problem

CRANE Valves End Excessive Shutdowns for Repairs

About every four months maintenance men of Sealtest, Central Division, Cincinnati, Ohio, had to replace worn, leaky discs and thread-stripped stems of valves used on the dairy's pasteurizing tanks.

The high cost of down time, labor and parts was only a part of this maintenance problem. Each time the valves had to be repaired, the dairy suffered a drop in production and faced the possible loss of 600 gallons of milk.

Upon recommendation, Crane No. 9 bronze globe valves, with quick-change composition disc, were installed. Today—two and one-half years later—these Crane valves, opened and closed a dozen times a day, have not cost the dairy one cent for repairs, or any loss in production or milk.

Here again is proof that Crane valve economy is never measurable in terms of first cost. You get it in years of maintenance-free service.

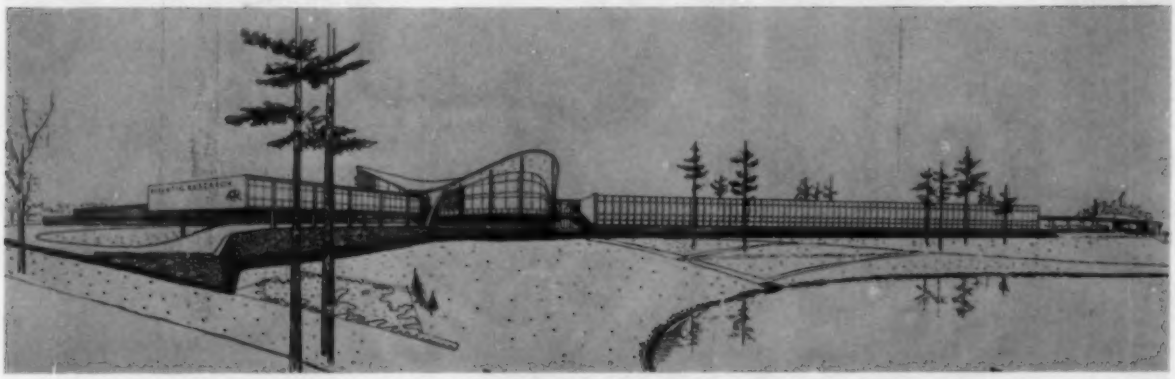
That's why more prudent buyers specify Crane valves for every service.

LEARN WHY Crane bronze valves with composition discs are so economical for service on steam, hot or cold water, oil or gas. Write to address below for Circular AD-2222.

CRANE VALVES & FITTINGS

PIPE • PLUMBING • KITCHENS • HEATING • AIR CONDITIONING

Since 1855 — Crane Co., General Offices: Chicago 5, Ill. Branches and Wholesalers Serving All Areas



$1 Million Atlantic Research Headquarters — Alexandria, Va.

Ground has been broken for the new headquarters of **Atlantic Research Corporation,** Alexandria, Va., according to **Dr. Arch Scurlock,** president. The 55,000 sq ft, million-dollar structure is expected to be occupied by the end of the year. The new headquarters building will be located at Shirley Highway and Edsall Road in Fairfax County, a suburban area of Washington, D. C.

From a two-man staff in 1949, the company has grown to its present employment of 250 in the Alexandria operations, and 125 in a West Coast manufacturing subsidiary, U. S. Flare Corporation and Associates.

Atlantic Research is a consulting research and development firm specializing in chemistry, electromechanics and electronics, physics, and applied mathematics.

Sun Oil Terminal for Louisville

With completion scheduled for autumn, **Sun Oil Company** is constructing a district terminal on the outskirts of Louisville at Bramer Lane and the Ohio River. Terminal adjoins the Stauffer Chemical Company plant.

Construction includes docking facilities, loading racks and a combination district sales office, truck dispatching center and garage.

New Arkansas Electronics Mfg.

Electro Precision Corporation is now manufacturing industrial electronic control systems in a new plant in **Arkadelphia, Ark.** First pilot runs were on a group of functional electronic "building blocks" which can be combined in a number of ways in large complex systems to control conveyor lines, machine speed, positioning of parts, etc. Company has national distribution of these units and other instruments for control and laboratory use.

John Housemann is president of the Company; **A. James Edwards** is engineering sales manager; and **Senator Ellis Fagan,** president of the Fagan Electric Company in Little Rock, is chairman of the board.

Compound Bend for TVA

THIS 20 ft length of 12-in. diameter seamless steel tubing will soon be carrying water at a pressure of 2300 psi at 493 F in service as a boiler feed discharge line at TVA's Johnsonville station. Part of a complete piping system engineered and fabricated by the Power Piping & Sprinkler Division of Blaw-Knox Company, Pittsburgh, the bend is made of type A106 grade B carbon steel with a wall thickness of 1.312-in.

Here's what you can do about the high cost of fuel.

Get the same heat from cheaper fuel with a

LJUNGSTROM® PACKAGE AIR PREHEATER

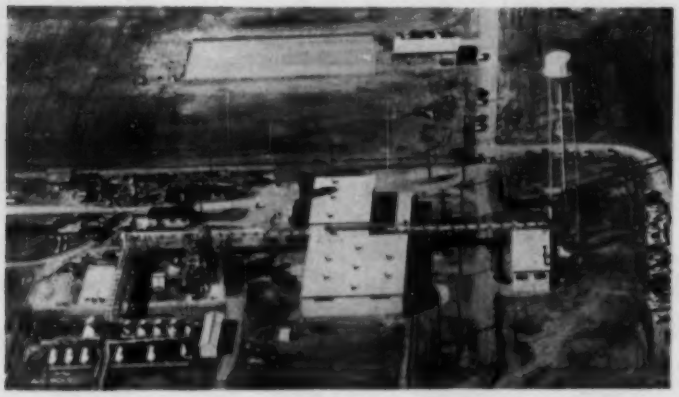
You can get standard operating temperatures from the cheaper fuels if combustion temperature is high enough. Peat, bagasse or even wood can be used successfully. The Ljungstrom Air Preheater can increase combustion temperature by as much as 300° by recovering heat from the exhaust gas. This reclaimed heat would otherwise go up the stack. All it costs is the price of the preheater—and the Ljungstrom can save enough on fuel to pay for itself in approximately two years.

You can be sure of maximum heat recovery because the Ljungstrom's exclusive rotary heat transfer element picks up the heat from the exhaust and puts it back into the combustion air without passing it through partitions or tube walls. Package design gives you all the advantages and economies of the Ljungstrom in a compact, preassembled unit. The Package Ljungstrom is available in vertical or horizontal models that are readily adaptable to any plant arrangement.

For further information, write today for the free 14-page Package Ljungstrom manual.

THE AIR PREHEATER CORPORATION

60 East 42nd Street, New York 17, N. Y.



M&T Opens $3.5 Million Kentucky Plant

The latest facility of **Metal and Thermit Corporation** occupies a 150 acre site near **Carrollton, Kentucky.** On stream last month, plant produces a series of butyltin and other organometallic chemicals used as stabilizers in the plastics industries as well as in the agricultural field and the paper industry.

Equipped with the latest technological facilities, the new operation is carried out without objectionable odor or waste disposal because of the efficiency of equipment. Water used in processing and discharged into the Ohio River is purer than water in the river. Three drilled wells furnish more than 1,000 gpm to meet the plant's requirements of some 5,000,000 gallons of water in a single shift.

Bakelite Polyethylene Plants in Production — W. Va & Texas

CHECKING METERS on central control panel at the new fully-automatic Seadrift, Texas, high-density polyethylene plant.

A new fully automated plant for making Bakelite high-density polyethylene is now in commercial production at Institute, West Virginia and another plant at Seadrift, Texas is scheduled for full production this month.

Both plants were built by Union Carbide Chemicals Company. Bakelite Company will direct operations, sales and technical services. Both companies are divisions of Union Carbide Corporation.

West Virginia — At the Institute plant, production based on Ziegler-type catalysis will be at an annual rate of 30,000,000 pounds. **J. H. Feld** is in charge of plant operation and maintenance and **L. N. Dickinson** is superintendent.

Texas — Seadrift, Texas facilities (placed in operation this month) have an annual production rate of 25,000,000 lb. **Marvin Echols** is in charge of the high-density area of the plant and **R. T. Barry** is superintendent. This is the second plant at Seadrift to produce Bakelite polyethylene resins.

To insure high quality and purity of materials, these plants incorporate automatic controls wherever possible. Console-type instrument panels provide a constant check on successive phases of production.

Markets for the Bakelite high-density polyethylene resins include film, coated paper and foil; housewares, toys and appliance parts; wire and cable; and monofilaments.

Southern States Expands Ga. Plant

$250,000 expansion program for **Southern States Equipment Corp.** of **Hampton, Georgia** is expected to be completed within six months, according to W. C. Mitchell, vice president.

This second major expansion in five years will be a new facility containing 32,500 sq ft which will join the present structure. Plans include enlargement of office and cafeteria space, larger parking facilities, and a new rail and truck entrance.

The company manufactures group-operated air switches, disconnects, power fuses, cutouts, connectors, substations and related products.

$2 Million Compressor Station—Blessing, Tex.

The Federal Power Commission has granted **Texas Eastern Transmission Corporation,** of Shreveport, La., temporary authorization for the construction and operation of a 6,600 hp compressor station near **Blessing,** Matagorda County, Tex.

Texas Eastern proposes to install six 1,000 hp reciprocating compressor units in the new station at an estimated cost of approximately $2,388,400. The new station will be located at the junction of Texas Eastern's existing 30-inch Vidor-McAllen and 24-inch Provident City-Blessing lines.

More New Plants — p 103

THE CITY THAT DIDN'T EXIST A MONTH AGO

Every 30 days the U. S. adds as many new Americans as live in Norfolk, Va.—creating brand-new wants and needs which must be satisfied.

What does this mean to you? It means greater opportunities than ever before—in all fields. Home construction is expected to double by 1975. Power companies plan to increase output 250% in the next 20 years to provide the power for scores of new labor-saving devices. Clothing suppliers predict a one-third increase in 7 years.

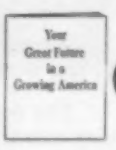
With 11,000 new citizen-consumers born every day, there's a new wave of opportunity coming.

7 BIG REASONS FOR CONFIDENCE IN AMERICA'S FUTURE

1. **More people** . . . Four million babies yearly. U. S. population has *doubled* in last 50 years! And our prosperity curve has always followed our population curve.
2. **More jobs** . . . Though employment in some areas has fallen off, there are *15 million* more jobs than in 1939—and there will be *22 million more* in 1975 than today.
3. **More income** . . . Family income after taxes is at an all-time high of $5300—is expected to pass $7000 by 1975.
4. **More production** . . . U. S. production *doubles* every 20 years. We will require millions more people to make, sell and distribute our products.
5. **More savings** . . . Individual savings are at highest level ever—*$340 billion*—a record amount available for spending.
6. **More research** . . . *$10 billion* spent each year will pay off in more jobs, better living, whole new industries.
7. **More needs** . . . In the next few years we will need *$500 billion* worth of schools, highways, homes, durable equipment. Meeting these needs will create new opportunities for everyone.

Add them up and you have the makings of another big upswing. Wise planners, builders and buyers will act *now* to get ready for it.

FREE! Send for this new 24-page illustrated booklet, "Your Great Future in a Growing America." Every American should know these facts. Drop a card today to: ADVERTISING COUNCIL, Box 10, Midtown Station, New York 18, N. Y.



(This space contributed as a public service by this magazine.)

MANAGEMENT CLINIC

Got Any New and Unneeded Employees?

Conducted by ROBERT H. EMERICK, North Charleston, S. C.

Question . . . . . .

AS A MIDDLE management man, and head of a production department, I am concerned by several actions of top management that to my mind, jeopardize the efficient running of my department. To put it bluntly, I've been used as a dumping ground for several individuals who wore out their welcome in other departments. My protests that I had no need for these people got nowhere; I was told that for certain high level reasons, jobs had to be found for them, and they were going on my payroll — period.

Since one of these men was on the executive roll and draws $15,000 a year, which is substantially more than my pay as head of the department, there are already rumors that I'm on the way out and he is to take over the department. Actually these rumors have no foundation but they do hurt department morale, and equally bad is the fact that I've got to absorb his fat salary somehow and hold my operations in the black. This I'm not at all sure I can do, but I'm told I'll have no allowance made for my new and unneeded employees, and I'm expected to show a profit no matter what's done to my payroll. How can I solve a problem like this?

Suggestion . . . . . .

THIS CASE resembles strongly a high level technique for getting rid of an unwanted member of the executive fraternity without actually telling him he is fired. It is tantamount to the Russian procedure of sending the doomed individual to Siberia.

You will note that your department *must take* him, but you have not been told that you *must keep* him. We feel quite sure that if you were to let him go after a reasonable time, on the grounds that he could not do the special work of your department, your action would not bring a single word of complaint from the higher levels. In short, you will have the responsibility for the ultimate dismissal, and the executive friends of the victim will express their sorrow to him and regret the company has nothing else to offer at the moment.

As we see it, this is what lies behind the actions of your top management. However there is also a strong possibility of your being able to use this man's undoubted executive talents for the improvement of your department. You might announce that he is being made a special assistant to you, a new position, and that his responsibility is to find better and more efficient ways for the department to do its work. Then turn him loose to study your operations and to generate some ideas. If he fails in this, he should understand that your department has nothing for him. He can resign or be discharged. Both of you may be pleasantly surprised however, and he might find a way to justify his job.

Similar treatment is appropriate for your other unneeded employees. If they can't do the work as assigned, release them.

The point is, that the actions of top management are not always as arbitrary as they seem. How you handle a situation such as this one can demonstrate effectively your readiness for the next step upward.

REPORT FROM THE HOME OF JOHNSON'S WAX ON

Sketch of the Johnson's Wax administration and research center.

3 FULL SEASONS' OPERATION WITH AE VIBRA-GRATE STOKER

Side elevation of a typical Vibra-Grate Stoker installation

Mr. Adrian R. Wilson, Assistant Power Plant Manager, says this about the AE Vibra-Grate Stoker now in its 4th year of operation at the Racine, Wis., plant of S. C. Johnson & Son, Inc.:

★ **Never an unscheduled shutdown during 10 months' continuous operation in each of 3 years.**

★ **Cost of repair parts approximately one cent per ton of coal burned . . . total cost slightly less than $200 while burning 20,169 tons.**

★ **Evaporation rate of 11.3# of steam to 1# of coal . . . 19% improvement over figures before installation of Vibra-Grate.**

★ **Continuous operation at 150 psi . . . load swings of 15,000 - 20,000# with only 3# to 4# variation in pressure.**

★ **Smoke and fly ash eliminated almost entirely, even in load range of 5,000 - 40,000# per hour. No fly ash collector needed. Since our plant is located in a residential area, elimination of these nuisances is extremely important from the public relations standpoint.**

★ **No trouble with clinkering or coking coals . . . they burn out to not more than 3% combustible.**

★ **A great variety of types and grades of fuel used without difficulty; low grade coals, wet bark mixed with coal, wood, sawdust, shavings, etc.**

The AE Vibra-Grate Stoker is designed to produce steam at the lowest possible cost per pound. Feeding and moving the fuel automatically by intermittent vibrating motions, the Vibra-Grate insures even distribution and avoids efficiency-reducing holes or light spots in the fuel bed. Its highly effective water-cooling system guarantees long grate life and minimum maintenance.

Years ahead of its time in design and performance, the Vibra-Grate offers you higher-than-ever efficiency at low over-all cost. If you're modernizing or replacing your power plant, write for details of the AE Vibra-Grate Stoker . . . you'll find it pays.

The Vibra-Grate as viewed from Mr. Wilson's office

AMERICAN ENGINEERING COMPANY
Wheatsheaf Lane and Sepviva Street
Philadelphia 37, Pennsylvania

Canadian Subsidiaries: Affiliated Engineering Corporations, Ltd., Montreal, P.Q., Bawden Industries Ltd., Toronto, Ont.

INDUSTRY SPEAKS

Good Planning . . . AHEAD

INDUSTRIAL plants which use both electric power and steam for processing can often achieve substantial savings in fuel and power costs by planning both systems together. At the recent American Power Conference W. B. Wilson and D. L. E. Jacobs of General Electric's Industrial Engineering Section, emphasized:

"Potential savings by proper selection of the steam and power cycle often go unrealized, because sufficient time is not allocated to make detailed step - by - step performance analyses when a new plant, a plant modernization, or a plant expansion is being considered."

They showed how eight or ten different combinations of power and steam systems can be compared on a preliminary basis, eliminating the least attractive, so that engineering effort can be devoted to detailed study of the promising possibilities.

They described a typical industrial plant which needed an automatic-extraction turbine to supply electric power and steam for processing. Short-cut evaluation methods showed that higher pressure and temperature for the inlet steam resulted in an annual fuel saving of almost $150,000 for each 10,000 kw generated. This saving is based on a fuel cost of 30c per million Btu and amounts to more than 1.6 mills per kw-hr.

They showed how, for any selected steam condition at the turbine inlet and at the exhaust point, the number of pounds of steam needed to produce a kilowatt hour can be calculated from theoretical steam rate tables and the known efficiency of the type of turbine or turbine-generator being considered.

"Fuel chargeable to power is as low as 4,600 to 5,000 Btu per kw-hr," they pointed out, "when generated with noncondensing or automatic-extraction turbines exhausting or extracting the steam required in process."

AT THE SAME conference, some new problems of voltage control that have arisen with increasing automation of factories and the movement of industry to suburban areas were discussed by George Walsh of General Electric's Industrial Engineering Section.

"Economical solutions exist for the most troublesome types of transient voltages," he declared, even though "the ideal system capable of delivering constant voltage and frequency at all times is not economically feasible."

He cited a recent survey which disclosed that three-fourths of the utilities questioned had had recent complaints of lost production and equipment damage in new voltage sensitive plants caused by voltage fluctuations — usually dips.

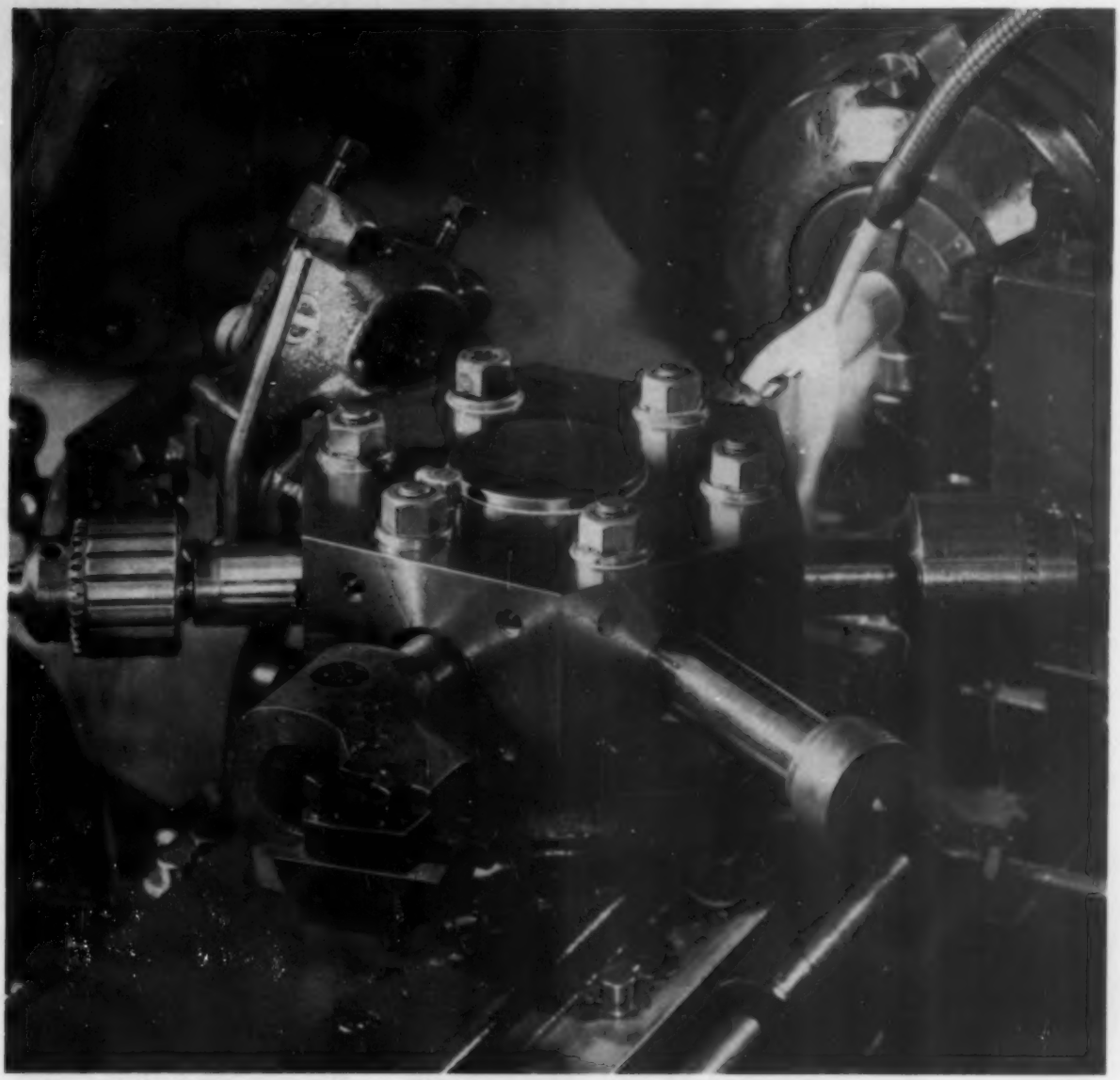
Half the utilities surveyed reported trouble due to undervoltage release on motor starters, and one-fourth involved automatic tool and work piece damage.

Voltage dips that are only a nuisance in old industrial plants (operators merely have to start their machines up again) can cause a long shutdown in an automated plant, where machines and conveyors are controlled by a complex system of contractors, relays and solenoids, with varying sensitivity to voltage.

Methods have been developed to modify control devices, Walsh said, to introduce a time delay to prevent shutdown on voltage dips of short duration. These methods permit making use of production machinery's inherent ability to "ride through" voltage dips.

"Avoidance of a shutdown merits additional capital investment," he declared, citing the experience in a partially automated auto assembly plant where thousands of man-hours of production were lost because startup required two to four hours.

"Although voltage dips are a fact of life in the suburban areas where many automated plants are located, various means are available and applicable within the plant to avoid shutdown or effect immediate, automatic restarting."



The Drops that Up Production!

In cutting oils it's the quality *each drop* delivers, not the quantity used, that ups production. Backed by the largest combined petroleum research and testing facilities in the world Standard Oil Cutting Oils are designed and refined to help secure improved finish and closer tolerances while giving tools a cushion against shock and a protection against wear in cutting, drilling, reaming and tapping operations.

The cooling effect of these oils is brought to a level that makes high speed work possible without machine damage. Rigid controls insure that every drop of Standard Oil Cutting Oils contains a full measure of these characteristics.

STANDARD OIL LUBRICANTS

STANDARD OIL COMPANY (Kentucky)

Be sure to date it-

No Errors Allowed

YOU CAN WRITE BETTER REPORTS

Remember- the boss may pass your report along to some one else - Will it still make sense?

By ROBERT HAYS
Assistant Professor
Southern Technical Institute
Atlanta, Georgia

REPORT from its original Latin roots means "to bring back"; but to you as a foreman or manager, it probably means "abominable nuisance," or at least "necessary evil." This article should aid you in facing the job of writing a report with less dread and fewer misgivings.

Writing reports is probably one of the two distinguishing features of a supervisor's routine. (The other is handling people.) If you worked your way up through the ranks to your present position, you can probably recall — maybe with fond memory — the good old days when you hit a time clock. You did not worry about any job but your own then; and you did not sweat out monthly progress reports, inspection reports, recommendations, or failure reports. As a skilled worker your job was perhaps nine-tenths real work and only one-tenth communication.

Now, for you, things are different. You do not have time even to keep your hand in at that first skilled job you learned. And in many companies the labor contract would not let you "spell" one of your workers on his job anyway. Instead, you spend hours pushing a pencil or dictating to a secretary.

This article will not dispel your nostalgia for your old job, nor will it make you eagerly anticipate your next report. But a few simple suggestions should help you when you write reports:

1. KNOW YOUR READERS. No, you will never have time to learn all the details about even one of your readers. But in general, you can help prepare yourself for writing the report by answering these questions about the person (s) who will probably read the report:

First, is the reader technically trained? How much basic explanation can I risk eliminating?

Second, is the reader supposed to take action, or is the report merely intended for his information?

Third, how familiar is the reader with the problem discussed in the report? And

Fourth, how urgent will the reader consider this report?

The answers to these questions will help you decide how detailed to make the report, how much preliminary material to review, and what priority to give the report.

2. MAKE AN OUTLINE. At this stage you have already gathered your data, the meat and potatoes of the report. You have also interpreted and evaluated your data. Now you must organize your data. The preachment "make an outline" probably appears in every text on report writing ever written. Yet somehow, as an industrial writer you may consider this advice too academic. Perhaps the trouble is that you, the busy supervisor, recall the last outline you prepared. You outlined a theme in high school English, and you spent so much time making the outline (your English teacher graded the outline for penmanship and spelling!) that you barely had had time to write the theme.

But look: preparing the monthly progress report or that accident report the casualty underwriter wants — these are not high school compositions. Nobody ever requests

the outline you as a supervisor used in writing your progress report. You can misspell words, write dangling or partial sentences, or commit every grammatical blunder in the book, because nobody will ever see your outline anyway. The important thing is to get those *ideas* arranged logically, before you start to write.

And it is much easier to rearrange fragments of sentences, or even a few words, than it is to rearrange finished sentences or whole paragraphs. For example, suppose the end of the month is approaching and the boss' secretary has sent you the usual tickler to remind you that the progress report is due tomorrow. You take out your yellow lined pad and jot down key words to call your attention to the things the boss needs to know. Perhaps your first list looks like this:

Down time on the tumbling operation — repairs made.
Pieces finished this month.
Joe Doe's accident.
Oughta do better next mo., up 6,000 pieces.
Commend Susie, good job retrained.
Didn't settle that grievance over change in clock station, sent to next arbitration stage.
Power failure twice, lost three hours.
Water cooler off kazip.
Recommend closer receiving inspection — too much reject and rework.
Installation of automatic feeder.
Man-hours worked, overtime.
Cost and standard unit cost.

Your list might contain these and other items in its initial outline form. As soon as you have put down everything which your facts, your records, and your memory suggest, go back over the list and organize it. Beside each item write a number, a number which indicates the importance of that item to your boss. Remember that in all levels of supervision except that of the lowest operating level, the next man up the line prepares his report from subordinates' reports. So in your progress report you will want to arrange items somewhat in order of importance. For a progress report this order, in skeleton form, usually looks somewhat like this:

Introduction, including activity and period covered by the report.
Summary of progress during the period.
Item held over since the last report.
Important work now in process.
Difficulties encountered or expected.
Personnel recommendations.
Forecast for next period.

Your list of items might be assigned numbers like these:

4. Down time on the tumbling operation — repairs made.
2. Pieces finished this month.
x. Joe Doe's accident.
6. Oughta do better next mo., up 6,000 pieces.
x. Commend Susie, good job retrained.
x. Didn't settle that grievance over change in clock station, sent to next arbitration stage.
4. Power failure twice, lost three hours.
x. Water cooler off kazip.
5. Recommend closer receiving inspection — too much reject and rework.

(*Continued next page*)

Some Things to Watch

* Slang and trick expressions are to be avoided (normally). They can be confusing.

* Your record file is the beginning of a good report. Also keep your notebook live.

* Watch product trade names—they are tricky. "Automatic" may be an adjective or a proper name: Automatic regulator.

* We are all salesmen. Reports are the best tools for selling ourselves.

* Watch averages—proper weight must be given:

Cost		Units		Avg. Cost
100	÷	5	=	20
88	÷	8	=	10
				15 is wrong
188	÷	13	=	14.45 is right

* Square; square feet; feet square:
1 square = 100 square ft
A table 2 ft square has 4 sq ft surface.

* Kilowatts and kilowatt-hours—even the experts slip on these common terms.

* Percentage of what?
"We are doing 100% better" means nothing.

* Men's names—be sure they are right. Even J. B. Smith might not be specific in a large organization.

ALL OF US are salesmen and reports are the best tools for selling ourselves. This discussion won't make you eagerly anticipate your next report but it can help you write a better one.

3. Installation of automatic feeder.
2. Man-hours worked, overtime.
2. Cost and standard unit cost.

For your revised outline, four items dropped from the original list. Joe Doe's accident, you remembered, was covered by the Safety Department's special report. Susie deserves a personal commendation, which would mean more to her than learning by gossip that you mentioned her in the progress report. You decide that you do not need to report any more on that grievance about the change in the clock station — the boss represents the company at the next stage, and he already knows as much about the grievance as you do. Finally, you settled the matter of the water cooler over lunch with Smoe of Maintenance, so why bother the boss?

But notice what you would have done if you had started writing without a skeleton. The downtime on the tumbling operation occurred yesterday, so you thought of that first. You would probably have written a whole page about the tumbler, whereas it really deserves only two sentences. Joe Doe's accident you'll never forget, because he lost a finger in a power shear; and because this accident impressed you, you would have included it in the wrong report, and well ahead of most of the sentences concerning production.

3. CHECK YOUR FACTS. Reports really serve only three purposes: to form the basis for a decision; to inform, perhaps for future decisions; or to preserve a legal or historical record of an activity. No report, however well written, can rise above its own facts. And one slip in presenting facts can rob the writer of the reader's confidence. Some questions you would want to ask yourself include these:

First, have I copied the figures accurately from the records, so that if the boss checks anything, I will not be embarrassed?

Second, have I performed all calculations correctly to the required number of significant digits?

Third, are the facts consistent? For example, suppose that in adding from the daily work records the number of widgits processed you arrived at a monthly total of 6,835. It would be very easy carelessly to write 6,335, and such a mistake may haunt you.

Or, suppose production rose from 6,000 units in March to 8,000 units in April. Suppose that in your report you plan to call this an increase of 25 per cent (a mistake you could easily make by dividing the increase by the wrong denominator). Now, the boss may not know whether in April you produced 7,999 units or 8,000 units. But he will probably know that rising from 6,000 to 8,000 means an increase of 33 1/3 per cent, not 25 per cent, and even by using rough slide-rule computations you should not get 25 per cent.

If in your second paragraph you intend to refer to 6,221 units as the month's production, the breakdown of the subtotals in paragraph 3 should total 6,221 and not some other figure. The reader may not know which total is right, but he will know one is wrong. If there is some reason why two figures which should agree still do not agree, the reader can expect an explanation for an obvious discrepancy.

4. WRITE ROUGH DRAFT. In writing a rough draft, pay no attention to the finer points of grammar, spelling or punctuation. Writing is like finishing a piece of wood. You would hardly start working unmilled lumber with 400-grit wet sandpaper. You would use an instrument that would remove large hunks before you started with pumice or fine sanding. In writing the rough draft, worry about ideas and their presentation, not about minor mechanics. Nobody will see the rough draft.

Only after you have finished the rough draft should you fret over editing the report. When you have written your last sentence, then you can go back to revise phrases, check spelling, correct punctuation, and change words.

Some managers prefer to dictate reports. This works well for a few people (especially when they have proficient secretaries), but not many of us think in so clearly organized a fashion that we can dictate with no corrections a report more than a few paragraphs long. The supervisor who fumbles, repeats, requests frequent rereadings, or changes his mind is wasting the secretary's time but still not saving his own. Of course, secretaries complain that if the boss writes all of his rough drafts, the secretaries "lose" their shorthand. Perhaps a compromise would be to dictate the short memos and letters but write out the longer rough drafts. And if your final draft is badly marked-up and hard to read — you can dictate from it.

5. CHECK FINAL DRAFT. In reading the typed copy ready for your signature you will face the temptation to sign without reading. "Sure," you will tell yourself, "Sally copied my edited rough draft correctly, so why do I need to read the thing again?" But take just a few minutes anyway. Perhaps Sally could not read your writing. Perhaps Sally just hit the wrong key on her typewriter, as even the best will do occasionally. And even if Sally rendered your ideas into letter-perfect typed copy, rereading the final draft will force you to check your own statements.

But you should read the final version at least once. One supervisor learned this the hard way. He prepared a recommendation, an intemperate one at that, which closed with the statement that the present method was "an utter failure." The final copy of that report, which unfortunately he did not read before signing, described one of his company's dearest policies as "an udder failure."

Since he had signed the report, it really was not Sally's fault that the boss returned it with a big red circle drawn around one word.

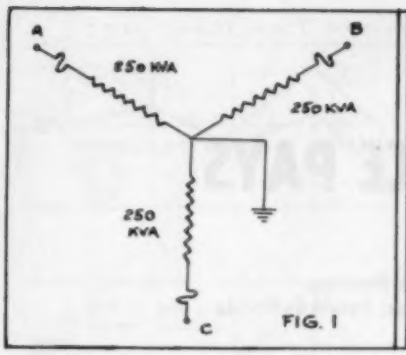


Fig. 1. Transformer connections

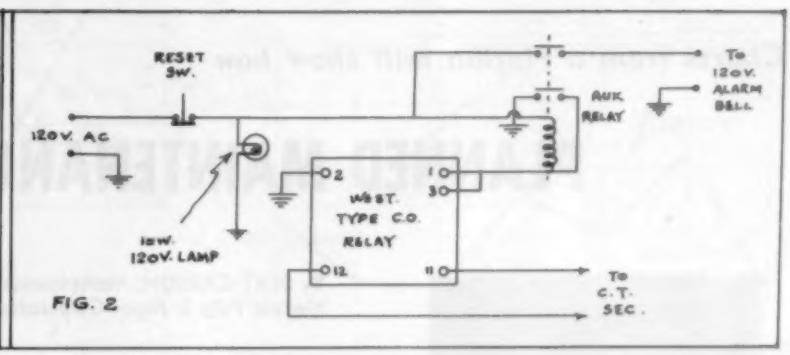


Fig. 2. Alarm circuits

Transformer Protection

By R. VAN SLEEN
Utilities Director
City of Gastonia, North Carolina

IN KEEPING with customary practice, our transformers are fused at approximately 200 per cent of full-load current. While such fusing offers very definite advantages insofar as overload capacity and surge currents are concerned, it can hardly be relied upon to protect the transformer from continuous dangerous overload — especially in the case of single-phase transformers having their primaries connected in wye to furnish three-phase power.

Consider the example shown in Fig. 1. With a system voltage of 2400/4160 Y, the full load primary current would be 104 amperes. Such a bank would normally be fused at 200 amperes per leg.

Suppose one primary fuse blew while the above bank carried 100 per cent load. The remaining transformers would attempt to carry the burden with the result that each would be loaded to 173% of its rating. The two good primary fuses would be carrying 180 amperes at this time and would not function.

This overload, if continued, would damage the windings and cause eventual failure of one or both transformers. Then, and only then, would the primary fuses blow, because their limitation would not be exceeded until the damage was done.

In an effort to prevent costly repairs and to avoid power interruptions, several schemes were proposed.

One scheme was to install contacts on the oil temperature gages. When the temperature exceeded a predetermined limit, an automatic switch could remove the bank from the line. However, this idea was abandoned due to the initial cost of equipment, the time delay associated with the heating of the oil, and the interruption to the service.

Another proposal was set forth using an alarm instead of the primary switch, but it was discovered that some of the transformers had no temperature gages, and also by the time the oil reached a dangerous temperature too little time remained for repairmen to correct the situation.

The final solution was to detect any significant unbalance in the neutral current and to use this unbalance to sound an alarm. This would give warning immediately, would not interrupt service, and would allow time for correction.

A 200/5 ampere current transformer was inserted in the neutral from the three transformers. The secondary was connected to a surplus Westinghouse Type CO relay and other equipment as shown in Fig. 2.

Any appreciable unbalance in the neutral trips the CO relay which, in turn, closes the auxiliary relay, sounding the alarm. The alarm will continue to sound until the reset switch is operated by hand. The 120 volt operating potential can be obtained from any convenient source, preferably from another transformer secondary.

Fig. 3. Alarm equipment

In actual practice, the alarm bell is mounted on a pole inside the transformer enclosure with a sign directly under it advising anyone hearing the bell to notify the Electric Dept. immediately.

Charts from a Florida mill show how . . .

PLANNED MAINTENANCE PAYS

By BERT CARSON, Maintenance Planner,
Hudson Pulp & Paper Corporation, Palatka, Florida

Before joining the Hudson organization, Mr. Carson served as Maintenance Planner for the Kimberly-Clark Corp., Coosa River Newsprint Mill, Coosa Pines, Alabama. He also worked with U. S. Steel Corp. and The American Cast Iron Pipe Corp. in Birmingham, Alabama.

The planned maintenance and cost control system at Hudson's Palatka plant was initiated in April, 1957 in accord with the principles and procedures in this article. As shown in the accompanying charts, maintenance costs were greatly reduced and production was increased.

INDUSTRIES today are "paying through the nose" for the inefficiency in their Maintenance Programming.

Huge maintenance crews are working by word of mouth through an overworked individual to whom they give a fancy title such as Maintenance Superintendent, Master Mechanic, or Chief Electrician. Some industries have such large maintenance crews that it requires all three. These men, with a vast knowledge of mechanical know-how, are spending from ten to twenty hours per day, seven days per week trying to keep their plant, or that section for which they are responsible, running.

Twenty to sixty percent of these men's effort is being spent as time keepers, errand boys, order boys, requisition signers, manpower jugglers, etc. Consequently, no time is left for looking into the mechanics of their crew's operation and asking themselves a few questions, such as: Is all this overtime necessary? Why was so much lost production time charged to maintenance last month? Can anything be done about the high percentage of emergency breakdown jobs?

The overworked minds of these Maintenance Supervisors refuse to function clearly at the end of the day, when they do finally get home. They must get some rest in order that they may be in as good physical condition as possible, to keep pace with all this confusion.

Well, Mr. Top Management, not only can something be done to remedy this situation, but it is being done. Wide awake companies are busily engaged in solving these problems. Is your competition getting keener? Then it may be due to a competitor finding the answers to these and other problems, with which industry finds itself faced today.

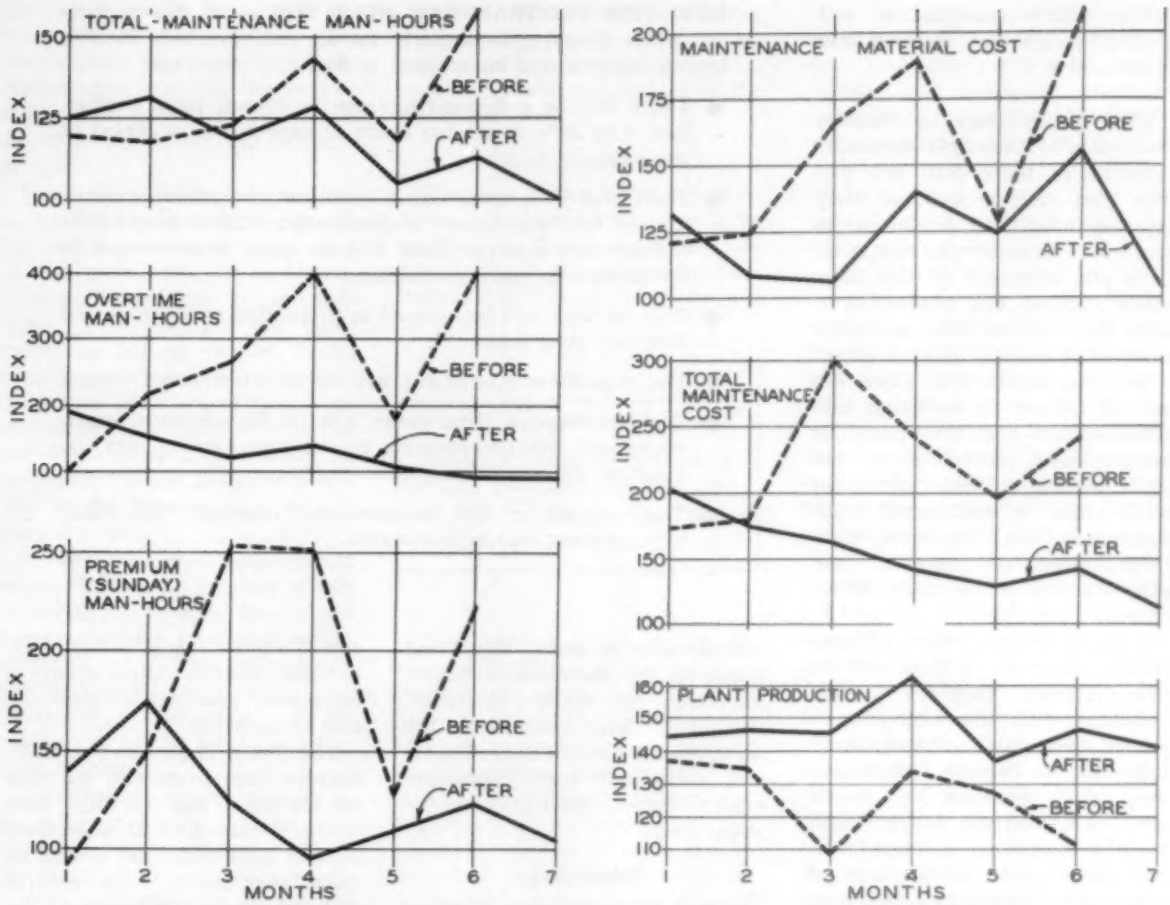
High maintenance cost is one of the first and highest production costs to reflect in the price of a product when it hits the competitive market. The company which controls this cost sets the pace for others to follow. Companies that control maintenance costs also control operating downtime with the same system. These companies are remaining comfortable in today's competitive market, while others are still seeking the answer to this problem.

Top management throughout America is well aware of the situation they face. The answer to this question which looms large in their minds is for the most part yet unanswered. Let's ask ourselves this question slowly. Just what can be done about high maintenance cost and low product output?

The only reasonable answer is to plan maintenance so that you get every ounce of production out of every piece of equipment with maximum economy.

How can this be done? In order to get maximum production from a plant, the equipment must take a beating. True, yet when this equipment was first installed it yielded maximum production. What has happened to the equipment since it was installed?

The new equipment became a victim of the production-maintenance "rat race." Due to pressing needs for repair of older equipment, new equipment has been neglected. The policy of industry



These six charts show results of planned maintenance at the Hudson Pulp & Paper Corporation, Palatka, Florida Mill. Relative (INDEX) figures at left of each chart permit the reader to visualize percentage of improvement, without stating actual production and costs.

has been, and for the most part still is, "as long as it runs leave it alone." This outlook is the prime reason industries all over America are "paying through the nose" for maintenance repairs caused by emergency breakdowns.

What is an emergency breakdown?

It immediately classifies itself. When a company has obligated itself to a customer for a certain quantity of a product by a set date and the equipment with which the product is manufactured breaks down, the repair to this equipment becomes a necessity.

Why does an emergency breakdown cost money and cause confusion?

First, manpower must be made available to make the repair. If the breakdown occurs at night, men must be called in. If during the regular working hours, some other repair job must be left undone. The maintenance man is very seldom convinced that this new breakdown is more important than the one he is leaving; therefore, his attitude is not conductive to an efficient repair of this one. When the defective part or parts have been determined, then the storeroom must be checked for replacements. Here is another hooker.

The storeroom doesn't have the parts. The Maintenance Supervisor was so busy with other duties that when this new machine was installed, he kept putting off the "setting up" of spare parts.

True, he intended to do this, but it slipped his mind. Now these parts must be had at all costs, as fast as they can be obtained. Now we have involved the Purchasing Agent in all this confusion. He immediately begins to place long distance phone calls. Quotations for the best prices are forgotten. He wants the parts at any price, and after locating the parts, his instructions are "rush 'em to the Airport, put 'em on the next plane."

In the meantime Production Superintendents are pulling their hair, maintenance men are being held over, excessive overtime and meal tickets are involved. When the parts arrive and are installed, how much longer will the machine run before some other worn out part breaks down? There is never a dull moment working in an in-

dustry where maintenance and production are not planned and co-ordinated.

What do we mean by Planned Production? Planned Maintenance?

Industries today will tell you they plan their production. They say they plan their production to conform with their expected sales. Let's ask ourselves if they have really planned their production or have they totaled their sales and dreamed of meeting delivery dates?

To plan production there are several factors to be taken into consideration: Can they count on uninterrupted operation of the plant insofar as their agreement with labor is concerned? Most companies can. Problems have been foreseen and remedied. Men can talk and settle their differences.

They have raw material contracts. They are assured of the raw materials. They are in good standing with the utility companies. Fine, but machinery can't talk, that is literally. Machinery does talk, however, to people who have learned its language. Every industry has personnel who can understand the language of machinery. The Machine Operator, the Engineers, the Millwrights, the Electricians, the Instrument Mechanics. They know by the sound of the machine when anything is amiss. Yes! the equipment on which the product is made must definitely be considered. The equipment which refines the raw material and transports it to the production machine must be taken into consideration.

Most industries, up until now, have overlooked the condition of their plants or have taken them for granted.

Planned Maintenance

By having a good planned maintenance program, co-ordinated with production and sales, 90% of this confusion can be eliminated.

A good Maintenance Control Superintendent is a major part of the answer to these problems. Teamwork among management is the rest.

In setting up the various parts of a good planned production and maintenance program, the Plant Engineer, the Maintenance Superintendent, the Master Mechanic, the Chief Electrician, and the Maintenance Control Superintendent, along with each production superintendent, must play on the same team.

HOW THIS PROGRAM CAN HELP YOU — If this maintenance program is properly set up and operated, the following benefits will be realized in less than one year:

- There will be a decided increase in overall plant production. 5 to 20% is not too much to expect over a period of one year.
- There will be a reduction in overtime and premium hours worked by maintenance tradesmen from 25 to over 100%. Maintenance material costs will go down in proportion to the increase in plant production.
- Call out time will be lowered in proportion to overtime and premium time hours.
- The production equipment will be in much better repair.
- The Maintenance Supervisors will be Maintenance Supervisors and not timekeepers, errand boys, order boys, requisition signers, or manpower jugglers.
- The confusion of the Maintenance-Production "Rat Race" in your plant will be eliminated.

Scheduling

Day to day scheduling of maintenance men should be the first step. A man who is familiar with the machinery and trades is needed to do the maintenance scheduling. Each trade foreman should be scheduled work comparable to his crew size daily, always scheduling those jobs which are vital to production first, then the repair of spare machine parts, then the convenience jobs.

Cost System

A Maintenance Cost System should be ready at the time the first daily schedule is issued. This system should be so designed as to keep the cost on each job performed and this cost reported to the Production Superintendent whose department is involved, upon the completion of the work. This cost system should also be set up to report at the end of each month, by department, the amount of money spent on each class of equipment (pumps, motors, conveyors, etc.), number of man-hours, labor cost, material cost, and total cost. Then a file kept in the Maintenance Control Department of completed jobs would show the cost of each job.

The Plant Engineer, the Maintenance Superintendent, the Master Mechanic, and the Chief Electrician should check through these jobs at least twice per month for high labor hours, high material cost and equipment downtime. The information they would receive from this file would help them to improve the efficiency of their crews.

The Planning and Scheduling Section of the Maintenance Control Department should flag repetitive repairs to the same piece of equipment so that engineering can be focused on this equipment. The data processing center of the Maintenance Control Department would furnish the Engineers with the purchase price and installation cost of the equipment while the cost section would furnish cost of repairs over a given period of time. Thereby the Plant Engineer would be able to make an intelligent decision concerning this equipment such as: is the equipment the right type, size, etc., for the job? should it be replaced, due to its worn condition? is a complete overhaul necessary? should it be altered?

Preventive Maintenance

After the day to day scheduling

has been installed along with the maintenance cost system, the Maintenance Supervisors and the Maintenance Control Supervisor should join forces in the setting up of a preventive maintenance program.

Each piece of equipment vital to production should be tagged, the number recorded along with all descriptive information (manufacturers name, size, horsepower, speed, type, etc.). Spare parts should be set up in the Stores Records and the name of the parts, the vendor from whom they were purchased and their location in the storeroom should be listed on the preventive maintenance record card in the Planning and Scheduling Section.

Regular inspection dates should be established and the card placed in a visible records file where these signals for inspection would be readily seen. These cards should also contain the numbers of like equipment in the plant and its location, including the location of spare equipment.

A lubrication system should be set up very similar to the preventive maintenance system, stating kinds of greases and oils to be used and dates for lubricating each piece of equipment.

From information gathered by the Planning and Scheduling Section and furnished to the Maintenance Control Supervisor, shutdown repair dates can be determined well in advance.

These shutdown dates should be established by the whole management team — the General Superintendent, the Resident Manager, the Production Planner, the Plant Engineer, the Master Mechanic, the Chief Electrician and all Production Superintendents, along with the Maintenance Control Superintendent. Sales and promised delivery dates should take precedence.

The shutdown dates of various departments or sections of departments should be staggered so that some production can go on uninterrupted even during long shutdowns.

The size of the maintenance crew and manpower available for the shutdown should be considered. The shutdown should be well organized far enough in advance so necessary repair parts, material, outside engineering help, etc., can arrive well in advance of the shutdown date.

Plant Shutdowns

There are times, however, when a total mill shutdown cannot be avoided. In this case, all maintenance should be concentrated on repairs that require the entire mill be down.

It will pay off . . .

Planned maintenance will pay off and here Bert Carson of Hudson Pulp & Paper Corp. shows you how it was done.

Days after holidays which require a shutdown of the mill are the days to effect these type repairs. During the two to three hour lull, when operators are checking their machines prior to start up and the Maintenance Department Personnel having been forewarned and briefed as to those repairs expected, these repairs will be made with a minimum loss of production.

All shutdown job requests should be in the Maintenance Planning Office well in advance of the shutdown. These jobs should be estimated as to manpower and elapsed time requirements. A shutdown preparation meeting should be set up for all Engineering and Production Management involved. Each job request should be considered on its own merits with the following thoughts in mind: The available maintenance manpower; downtime required to do the job. Will this job require a total mill shutdown, a departmental shutdown, or the shutdown of one machine? Priorities should be established on each job to be done. The final shutdown procedure should be assembled according to the importance of each job order, taking all total mill shutdown jobs first, then departmental shutdowns, etc.

When the final shutdown schedule has been assembled, conforming to the size of the maintenance crew and available time, the schedule should be printed and a final shutdown meeting of maintenance and production management should be held. Each individual concerned should have a thorough understanding of the work to be performed and the approximate time when men will begin work on each job.

The shutdown schedule will clearly show the most efficient manner in which the work can best be accomplished. In the event that other work comes up which has not been foreseen, the equivalent in man-hours must either be removed from the prevailing shutdown schedule or downtime allowed over and above the scheduled time to accomplish this additional work. The shutdown schedule after being published, should not be changed under any circumstances, without the approval of the General Superintendent.

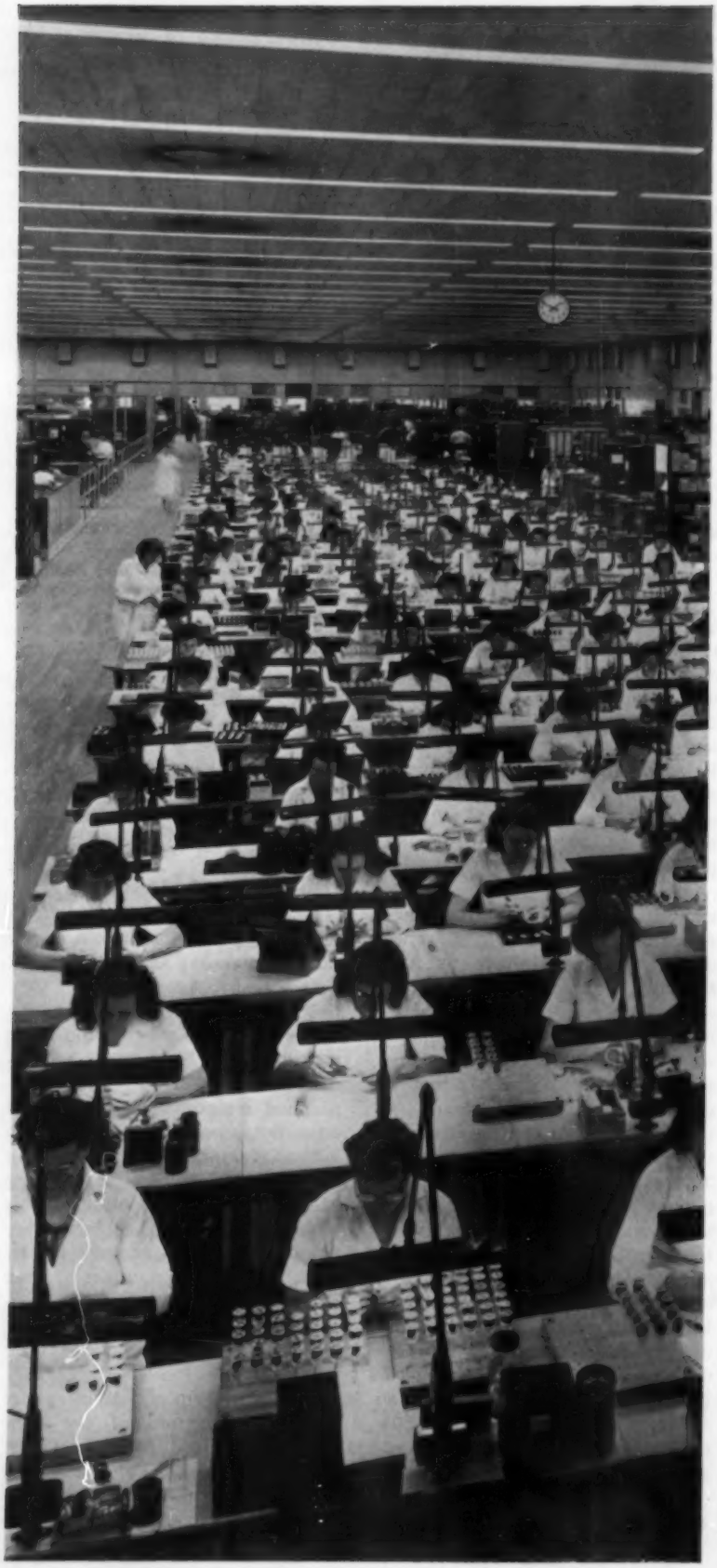
Mr. Top Management, here are the answers to one of your toughest problems. There are many variations to this system. Regardless of how basically sound the system might seem, it must be installed and operated by competent personnel and tailored to your own individual needs.

Planning Experience

Many industries call themselves planning their maintenance the same as planning their production.

Many have attempted the setting up of this system with young engineers who have had no basic training. They have either become discouraged and discarded the planned maintenance program or have continued to go along with a man taking orders and doing the leg work which the Master Mechanic previously did. In this case the situation becomes more confused because another bottleneck has been established. They call this man a Maintenance Planner, for lack of a better name, when in reality he is an errand boy.

The setting up of a Maintenance Planning Program of the type herein described requires highly skilled specialists. For a company to attempt this system without this type personnel, can be disastrous.



GOOD LIGHTING a Tool for Production

SOME PROCESSES require a special type of lighting in order to inspect the product better, to complete a process accurately, to match colors, to control a machine setting or some other task which presents a difficult seeing job. With the many lamps and types of lighting equipment available today, there should be no job that will hold up production or create excessive errors and waste because the illumination isn't just right for that job.

Special illumination over a local area is often called supplementary lighting since it supplements the general illumination in the room. In some plants, small lamps in reflectors attached to machines have served as strictly local lighting without a general lighting system to provide overall illumination throughout the plant. Such practice is obviously not advisable since it does not assure good seeing nor is there a comfortable working environment. Too often poorly designed lighting equipment permits the operator to adjust the lamp so that its brightness does not annoy him but unfortunately creates a dev-

Fig. 1. Additional quantity of illumination provides 200 footcandles for fabrication of fine parts. Fluorescent lamps mounted on work benches supplement good lighting from general lighting system.

PART 9 —— Special Applications

By ROY A. PALMER
Duke Power Company
Charlotte, North Carolina

astating glare for workers at other machines.

Thus, where supplementary lighting can be used to advantage for specific processes, it must not be substituted for general illumination but supplementary to it. The equipment must be well designed, perferably in a fixed position to avoid areas of excessive glare.

There are four general methods of supplementary lighting. The first is intended merely to supply additional light from a well-shielded light source. Another method is provided by a relatively large light source of uniform brightness which in effect, becomes a miniature "sky." The third employs a directional light source, while the the fourth method may use polarized light, black light, optical magnification, or light for color discrimination or matching.

All of these methods permit the operator to see small details, flaws, leaks, irregularities, pit marks, scratches and similar undesirable characteristics that affect speed and quality of production. When the cost of labor is considered with respect to finding and determining the extent of these defects, the need for speedy, accurate seeing is obvious.

Added Foot-candles

Even where the general illumination is on the order of 50 or 75 foot-candles, there is often need for 200 or more foot-candles over a small area where close work is done or fine details are to be observed. These additional foot-candles can be obtained from lamps mounted on benches or machines. A reflector-type lamp mounted a short distance away from the work with its beam focused on the critical seeing area often provides an answer to a problem of this kind. Fabrication of fine parts on a long table may require a series of fluorescent lamps in well-shielded reflectors mounted on and running the full length of the table. In all cases the lighting units should be rigidly installed so that they cannot be moved easily either manually or by vibration of machines to cause glare in the line of vision of other workers.

Large-area Light Source

Many inspection jobs can be done very satisfactorily by viewing the product either under a large area light source or by transillumination. The light source can be an enclosure painted white inside and having a number of fluorescent lamps spaced no further apart than the distance from the lamp to the cover of translucent plastic or glass. Fluorescent lamps are generally more desirable than incandescent lamps for this purpose because they produce less heat, although smaller enclosures can use them to advantage.

Cloth can be quickly inspected by transillumination from one of the light sources by passing it over the illuminated cover. The food industry uses this method of inspecting bottles for foreign materials. Here the luminous panel is placed vertically and the bottles are passed in front of it. Transparent products of many types can be inspected for cracks, chips, air-bubbles or other defects.

The same type of light source can be used for inspection by controlled reflections. A criss-cross pattern is painted on the translucent surface of the light source. Products having shiny or specular surfaces can be checked for smoothness, dents, etc. Irregularities in the reflected lines indicate these surface defects as the product is moved slightly. The automobile industry uses this method to assure piano-finish smoothness in painted surfaces.

Directional Light Sources

In most surfaces which are mat finished or which do not have specular surfaces, the criss-cross technique will not suffice. A beam of light which strikes the surface at an oblique angle will reveal pit marks, irregularities, surface flaws, etc., in the mat-type product. When the directional beam of light strikes the surface at an oblique angle, the defects show up as highlights and shadows. Sometimes, specular surfaces of glass or metal can be checked for scratches or uneveness better than by the large-area light source.

Lamps having concentrated beams, such as PAR reflector lamps, should be used for directional lighting. They should be placed so that their beams do not strike the operator's eyes. The number of lamps will depend upon the size of the material to be inspected. The operator can move the lamps or the product so that the best grazing angle can be determined for seeing the defects.

Another method of directional lighting — edge lighting — is used for checking internal bubbles or irregularities in transparent plastic or glass. A fluorescent lamp is enclosed so that only a strip of light emerges from a slot the length of the lamp. The edge of the plastic or glass is placed along this slot. The defects can then easily be seen. The glass or plas-

tic must rest on a black background such as black velvet.

Specialized Lighting

There are many types of lighting which can be classified under specialized lighting since there are a multiude of processes that can be seen better under different types and color of light than by general lighting or by the supplemental lighting methods described above.

Minute products most always require faultless accuracy. To detect flaws or imperfections in such small items, high foot-candles alone cannot reveal them. Magnification is necessary. Sometimes large lenses on adjustable arms can suffice. A circline fluorescent lamp with the lens in the center and completely shielded from the eyes of the operator provides not only magnification but good illumination as well.

Where objects are too small for direct observation by a lens, they can be enlarged to almost any size necessary by projection. The minute objects can be placed on the table under an optical system which projects them on a screen in full view of the operator, thus making easy and complete identification of flaws or imperfections possible.

Polarized light has distinct advantages for inspection of flaws in transparent glass and plastic. Light can be said to vibrate in horizontal and vertical directions. A plastic material called polaroid which has innumerable submicroscopic needle-like crystals imbeded in plastic and parallel to each other, has the unique property of transmitting only those vibrations of light which vibrate in one direction. The light is then said to be *polarized*.

When two pieces of polaroid material are so placed that the submicroscopic crystals are at right angles to each other, a minimum amount of light is transmitted. If a glass or transparent plastic is held between these two pieces of polarized material, any internal strains in the observed objects will appear as color fringes. Thus, glass bottles, plates or similar material can be inspected for strains which might make them unfit for the service for which they were intended.

Black light serves as another method of inspecting many products which cannot be checked in any other way with as great accuracy. Black light is so called because it is invisible. It is radiation which exists outside the visible spectrum at the violet end. Its more correct appellation is "ultraviolet."

Ultraviolet has the unique property of causing many materials to glow or fluoresce. Fine fluorescent power wiped across a metal surface lodges in imperfections and reveals such defects clearly under ultraviolet or "black light." Oil spots fluoresce blue under black light but may be practically invisible under ordinary light. The textile industry uses black light extensively to detect oil spots in cloth.

Black light is also used in many processes. Chalk which is used for marking a design to sew on cloth is invisible under ordinary light but fluoresces brilliantly under black light. A thread is woven into cloth which is the same color as other threads under ordinary light but fluoresces a different color under black light. Thus, the cloth can be identified by the manufacturer.

Lamps which produce black light are available on the market in several forms. The most effective are the mercury-arc type which includes fluorescent lamps that have a tube of purple glass which filters out most of the visible light created by the mercury arc and transmits the invisible black light.

Color rendition and color matching are important in some plants. Fundamentally, we see things by the light reflected from them. Since ordinary light, such as daylight, has all the colors of the rainbow, a red object appears red only because it absorbs all the other colors in the light but reflects the red light to our eyes, and so on with all the other colors. If we have too much blue light from a source of light, all reds will appear dull and purplish. Therefore, it is important to have lighting which gives the right spectral quality for viewing colors where their proper rendition is necessary.

We often refer to daylight as the ideal illuminant for color matching. Actually, daylight varies so widely in color from one hour to another that color which we thought would match when viewed in the morning would be off considerably in the afternoon. Specialists in color work have often been trained under daylight grading and may find it difficult to change to an artificial light source, although this source would be much more stable and accurate than daylight. If he would use the deluxe cool white fluorescent lamp it would perhaps be easiest to make the change, providing that he would be tempermentally amenable to making a change. For example, tobacco auctioneers

(*Continued on page* 64)

Fig. 2. Seams are inspected by transillumination. Lamps are mounted under the translucent glass in the table top.

Fig. 3. A large area light source makes inspection of specular surfaces easy.

Fig. 4. Magnification of small parts by this special projector aids in the inspection of gears, cams, etc.

Fig. 5. An ultraviolet (black light) lamp shows clearly the design to be sewn which has been drawn on the cloth by invisible chalk.

Fig. 6. Controlled reflection in this 500-foot-candle "tunnel of light" permits inspection for flaws quickly.

Fig. 7. Directional lighting assists the operator to find possible defect in paper. Lamps are arranged so that they can be adjusted for proper gazing angle.

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Better Quality...

1 — One skilled worker operates the Kamyr continuous digester from this control room. Silhouettes on schematic arrangement represent heaters, digester, and blow tank.

Continuous Pulp Processing and Automation Features of Alabama Mill

CLEAN, white, sulphate pulp is the end product of Gulf States Paper Company's new mill near Demopolis, Alabama. Both hardwoods and pine woods are employed as raw materials.

The 300 ton per day mill will produce pulp for domestic and foreign markets. No paper will be made there.

The most unique feature of the plant is the continuous operation of the digester as contrasted with most mills that operate on a batch process. Continuous pulping is accomplished in a Kamyr digester — largest continuous unit in the United States.

Other elements of the mill are somewhat conventional: barking, chipping, preparation and reclamation of chemicals, washing, screening, bleaching, pulp-forming, drying and packaging.

Continuity of the process, however, has contributed to unusually thorough mechanization of the entire manufacturing procedure. And the high degree of automation contributes to compact design and relatively low manpower.

Another interesting feature, also aided by continuity of process, is low storage capacity between processing stages. Also minimum spare equipment is evident in the design: one turbine-generator, one power boiler, one recovery boiler, one digester, etc. But capacity for expansion is provided in some elements such as: wood preparation, water supply, and packaging and handling facilities for finished pulp.

Heart of the continuous process is the Kamyr digester. The big trick here is moving material through two pressure stages (13 and 165 lb) without interruption. A rotating cylinder with pockets in it does the job. This rotating pressure lock receives chips at low pressure and after a quarter turn discharges to the high pressure system. Various pockets in the cylinder are receiving and discharging all the time. Thus movement from high to low pressure section is continuous.

Chips are jetted, or sluiced, from the discharge side of the pressure lock into the top of the 90' high digester tower by the cooking solution, also being delivered to the tower at high pressure.

Pressure locks are also employed to carry chips into the first (13 lb) stage, and to discharge digested material into the blow tank from the bottom of the digester tower.

Plant Services

As in all chemical processes, power, steam and water are important at Demopolis. At normal full operation the plant requires 7500 kwh per hour, 18,000,000 gallons of water per day, and 300,000 pounds of process steam per hour.

Materials handling and instrumentation and controls are other elements of the plant that will be of interest to engineers in other types of industrial operations, as well as pulp mills.

Water

The entire mill water supply is taken from the adjacent Tombigbee River, and clarified in gravity filters before delivery to mill processes. Drinking water is further treated by chlorination, and boiler feedwater is demineralized. Efflu-

. . . Better Controls

2 — Looking up at control circuits suspended from floor above. Note extent of mechanization and automation necessary for a continuous process plant.

ent from the plant goes to a holding basin for aeration and settling out solids before discharge to the river.

Four vertical pumps of 5000 gpm capacity deliver water from the screened intake chamber to a pair of 88 ft diameter clarifiers before delivery to eight gravity sand filters.

Part of the water, however, bypasses the clarifiers and filters. Raw water is fed direct to the jet condensers on the liquor evaporators and then moves on to supply the log flame. Water that has been clarified, but not filtered, is used in the turbine-condenser chlorine dioxide regenerator unit before returning for cleaning in the sand filters with the remainder of clarified water.

The only water that is given the final treatment in demineralizers is that used for boiler feed make-up.

Power

A power boiler and a recovery boiler with combined capacity of 370,000 lb/hr supply steam for power and processing.

The power boiler is a 200,000 lb/hr multi-fuel unit. Bark is fed by a jet spreader, and a chain grate spreader stoker is provided for coal. Normally gas will supplement bark as the fuel used, but oil may also be burned. A dust collector is provided to clean stack discharge, and full automatic combustion controls are provided.

The recovery unit handles 990,000 lb of solids per day and produces 170,000 pounds of steam per hour. The unit is equipped with a venturi scrubber which cleans the exit gases, recovers chemicals and concentrates the liquor for burning in the recovery furnace. Oil is the auxiliary fuel.

This unit is equipped with steam soot blowers, and shot cleaning is employed in the economizer. Combustion air is heated by steam. A turbine-driven induced fan, and a motor-driven forced draft fan are employed.

A deaerating heater supplies water to the two feed pumps that supply both boilers. Water leaving the pumps is raised to 300 F in a closed heater, using 160 lb steam. Make-up (33% maximum) is filtered mill water, further purified by a two-bed anion and cation demineralizer.

Steam leaves the boilers at 600 psi and 750 F. Most of the mill steam goes through an extraction turbine for pressure reduction and control, but supplementary reducing and desuperheating equipment is provided to make up any deficiency in bled steam and to improve operating flexibility.

Electric power is produced by one 9375 kw turbine-generator. A tie-in with Alabama Power Company supplies or takes power as necessary to compensate for unbalance between steam and power loads of the mill.

Steam is extracted from the turbine at 160 lb and 50 lb for pulp processing, and a surface condenser receives remaining steam as necessary to maintain steam and electric load balance.

Materials Handling

Materials handling is a big element in all pulp mills, and as will be seen in the photographs, it looms big at Demopolis. But actually conventional equipment is used throughout for this operation.

Wood delivered on railroad cars may be mechanically pulled into the flume that supplies the barkers and chippers, or it may be picked off by grapple and crane for storage.

The 1250 ft long flume washes off mud and grit as it carries logs to the barker. Bark is screened and hogged to proper size before delivery by belt conveyor to the boiler.

Barked logs are sorted on a belt

A Quickie Tour of the Plant

FLOW OF MATERIALS . . . . . .

Wood is received on RR Cars and dumped into the flume (Fig. 3) which floats it to barkers and chippers (Fig. 4). Chips go to silos (Fig. 5) and then by conveyor to digesters and bleachers (Fig. 6). Bleached pulp is dried (Fig. 7), cut into strips (Fig. 8), and moved to baling and packaging (Fig. 9).

Lime is made in kiln (Fig. 10) and mixed with other chemicals (Fig. 5). Chemical liquor goes to digesters (Fig. 6) and spent liquor goes back to recovery boiler (Fig. 12) where it is concentrated and burned to reclaim chemicals and make steam.

Bark from barkers (Fig. 4) is also burned in the power boiler (Fig. 12) to supplement steam from recovery boiler.

Water from system (Fig. 6) keeps stock wet and power from generator (Fig. 11) keeps it moving.

The trip from barkers to dry pulp requires about 24 hours excluding storage time. While operating index figures have not yet been established at Demopolis, experience in other mills indicates that one ton of pulp will require 2 cords of wood, 24,000 pounds of steam, 60,000 gallons of water, and 600 kwh of electricity. Also considerable quantities of lime, soda ash, sodium chlorate, sulphuric acid and other chemicals will be used in the pulp making process.

3 — A rail-mounted crane unloads pulpwood from cars and adds it to the 12,000 cord capacity wood yard at Gulf States Paper's Demopolis, Ala. market pulp mill. Wood needed for immediate operation is mechanically pulled into the flume by the gradall straddling the flume in the background.

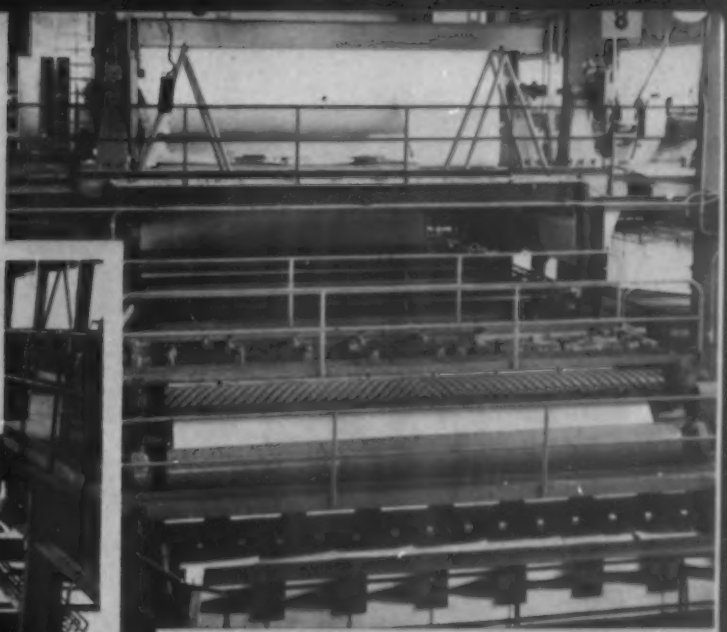
4 — Wood is freed of bark by this rotating drum. Structure at rear houses machines that reduce wood to chips for digesters.

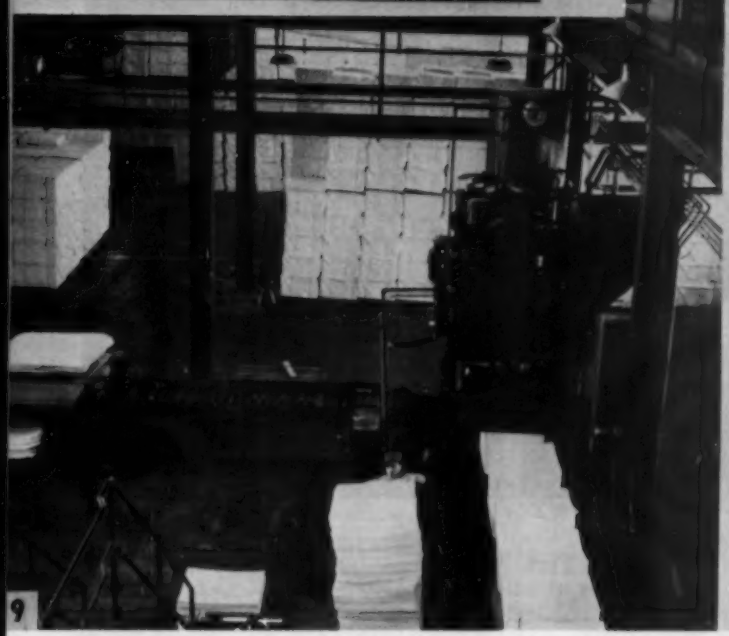
5 — Chip silos at left. Powerhouse rises above the caustic and recovery section at center.

6 — Beyond the water treating section, a covered conveyor carries chips to the Kamyr digester. Bleach plant stands in the background.

7 — The pulp-drying machine is entirely enclosed in a hood. Wet pulp enters at far end; dried roll is seen at right.

8 — Wide rolls of glistening white pulp are sliced into strips and cut into sheets, which are automatically baled. See Fig. 7.



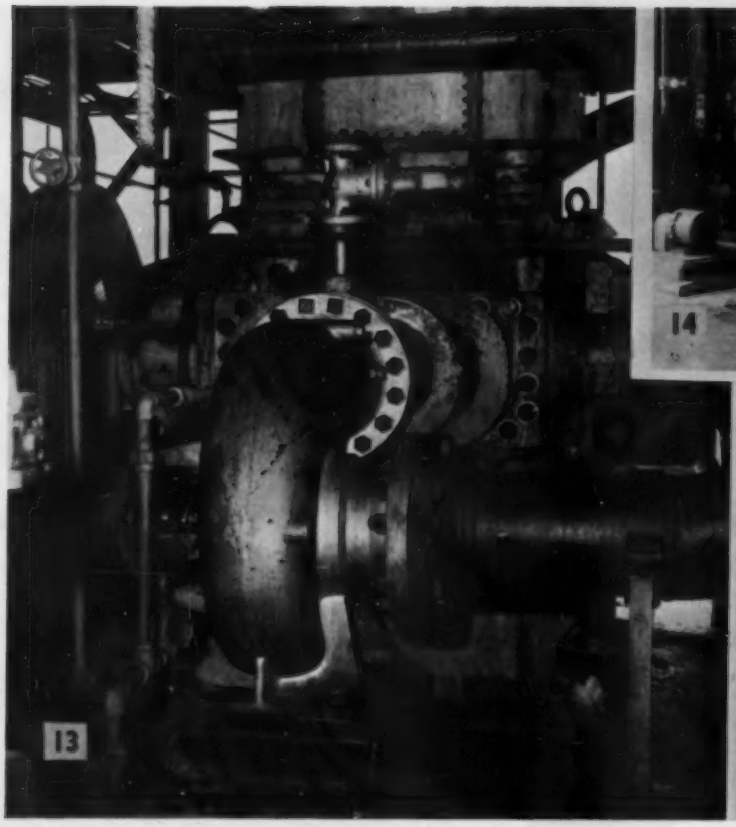


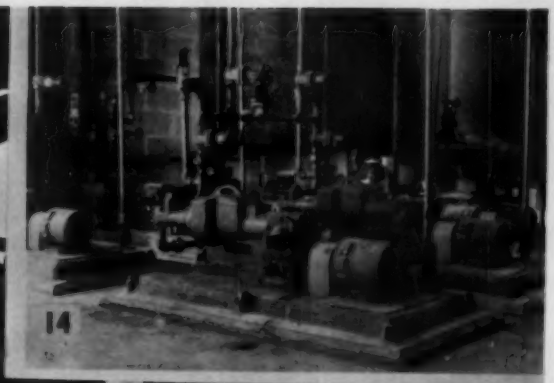
9 — Stacks of E-Z PULP are automatically weighed, recorded, pressed, and strapped. Movement to the shipping platform at rear is entirely mechanized.

10 — Lime for use in the chemical process is made at the mill in this kiln.

11 — Steam goes to the 9,375 kw turbine-generator at 575 psi and 750 F. Steam is extracted at 160 psi and 50 psi for mill processing. Remaining steam goes to a surface condenser.

12 — The power house contains boilers for the recovery process as well as for power. Bark and lignin constitute a large part of the fuel. Feed water make-up is processed in demineralizers at left on first floor.





conveyor and those that are ready for the chippers are delivered by chain conveyor. Chips are screened and delivered by chain conveyer to the top of two silos 30 ft in diameter and 65 ft high.

Chips are withdrawn from the silos by rotary plate feeders and carried to the first processing stage by a 30 in. belt conveyor.

One important consideration in the movement through digesting and bleaching is the need for absolute cleanliness. No "specks" are permissible in the high grade snow white pulp. Therefore, stainless steel piping is employed, and all pits and chests are lined with tile.

Handling of general interest and application, however, picks up again where the dried pulp is cut into sheets and packaged.

Mechanically piled sheets from the machine are conveyed into a pivoted - swing conveyor which feeds them individually to a scale. Weighed stacks then move to a baling press for wrapping and wire tying. Completed bales are stacked 4 or 5 to a pile enroute to shipping and storage. Fork lift trucks pick up the piles of bales, weigh them on a dial shipping scale, and load them into cars.

Operation

The high degree of mechanization and automation possible in the continuous pulping process permits the plant to operate with minimum personnel. But at the same time need for dependability is increased and more instruments and automatic controls are required. Even so, little spare equipment is installed. Each element is designed to be as trouble free as possible, and preventive maintenance is depended upon to keep equipment in service except during scheduled shut-down intervals.

Key operating and supervisory personnel are experienced from service in other plants, and the local area supplied most of the trainees who are rapidly becoming skilled pulp makers.

Most of the men are given "crew assignments" rather than "job assignments." Members of each crew are identified by distinctive arm bands, and each member of a crew can work any position in his crew. Thus, better work distribution is attained, and the men get more interesting work and better opportunity to broaden

13 — The high pressure feeder is the heart of the Kamyr process. Chips from the 13 psi steaming vessel, mixed with liquor, enter a rotating cylinder which discharges the mixture into the 165 psi digester.

14 — Proportioning pumps supply chemicals for the water treating plant.

15 — This chain grate spreader stoker feeds coal to the power boiler. Bark is burned also in this boiler. It is also equipped to burn oil and gas.

16 — Two of the four 5,000 gpm, motor-driven pumps that supply the pulp mill with water from the Tombigbee River.

17 — Debris from the flume is removed by a bucket conveyor which dumps into a Dempster Dumpster, rail mounted for ease of removal.

Why Every Steam Heated Unit Needs its Own Steam Trap

. . . the theory, practice and proof of "unit trapping" for top temperatures

Using an individual trap for each steam heated unit, including each separate coil, chest or chamber of a machine—pays off for the user. Here are just two examples:

1. On a creamery dryer

Drainage Method	*Air Temperature*
Restricted Blow-thru	250°
Group trapping (1 trap for 8 coils)	225°
Armstrong Unit Trapping (8 traps—1 for each coil)	**309°**

2. On a platen press

Drainage Method	*Processing Time*
Restricted Blow-thru	50 minutes
Group Trapping	35 minutes
Armstrong Unit Trapping	**25 minutes**

Why Unit Trapping Works Best

It is reasonable to assume that no two steam heated units will have *identical* condensing rates. Even the slightest difference in rate will cause a difference in steam pressure drops through the units. Here's where the trouble starts. Condensate from each unit may flow to the trap. But, what about air and other non-condensibles in the system? A difference in pressure drops too small to be indicated by an ordinary pressure gauge will permit backflow of steam from the higher pressure units to the lower pressure units. This backflow of steam may even impede flow of condensate from the lower pressure unit to the trap . . . and it will definitely impede or block off flow of air to the trap. The result is sluggish heating, reduced temperatures, reduced output, fuel waste and increased possibility of corrosion. Figures 1, 2 and 3 diagram the action.

Unit Trapping Not Costly

No engineer wants any more mechanical devices in his plant than are absolutely necessary. But, the moderate additional cost of using two or more small traps, instead of one big one, is saved over and over again in improved efficiency.

If the traps are Armstrong, maintenance is no problem. And users frequently tell us that Armstrong traps outlast others two and three to one.

Steam traps usually represent a fraction of 1% of the cost of the equipment they drain. Does it make good sense to lose 10% or more of equipment capacity to save a few dollars on traps?

Why not test Armstrong unit trapping in your plant. If you are not completely satisfied with the results you can return the traps for a full refund of the purchase price. There is little to lose—lots to gain. Call your local Armstrong Factory Representative or Distributor, or write **Armstrong Machine Works, 8063 Maple St., Three Rivers, Mich.**

ASK FOR the 44-page Steam Trap Book and reprint of article on Unit Trapping.

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ARMSTRONG STEAM TRAPS

How Different Condensing Rates Can Slow Production

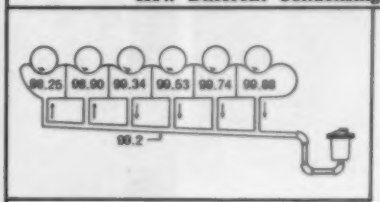


Fig. 1 This is a 6-roll ironer shortly after it has begun operating on 100 psi steam. When cold, wet material passes over chest 1, steam condensing rate is high and pressure drops accordingly. The pressure drop in chest 2 will not be as great, and so on down the machine as the material becomes progressively hotter and drier. Average pressure in the chests then is 99.27 lbs., and drain header pressure is slightly less, about 99.2 lbs. Under these conditions, steam from drain header enters chests 1 and 2 (as indicated by arrows at side of drain lines) because of pressure difference. Though condensate from chests drains by gravity, air can't leave chests countercurrent to incoming steam. Fig. 2 shows what happens next.

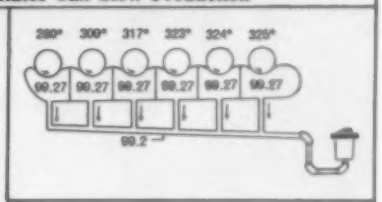


Fig. 2 This is the same 6-roll ironer after it has been operating a while. Air has accumulated in chests 1 and 2, reducing condensing rate and decreasing pressure drop. This process repeats itself down the line until pressures are as shown—that is, enough air will accumulate in each chest so that condensing rates and pressure drops of all chests will be about equal. The net result is shown in chest temperatures which are actual pyrometer readings taken on a 6-roll ironer, drained by a master trap, in a Chicago laundry. The laundry was making 337.9°F steam, but getting an average of only 309.6°F from the ironing surfaces, necessitating slow operation and frequent reruns. Then they tried Armstrong unit trapping—see Fig 3.

How Unit Trapping Prevents Trouble

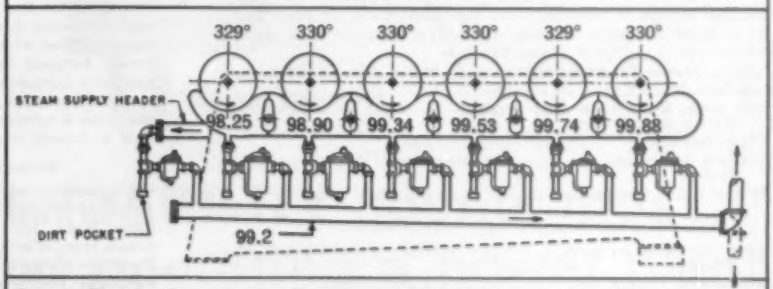
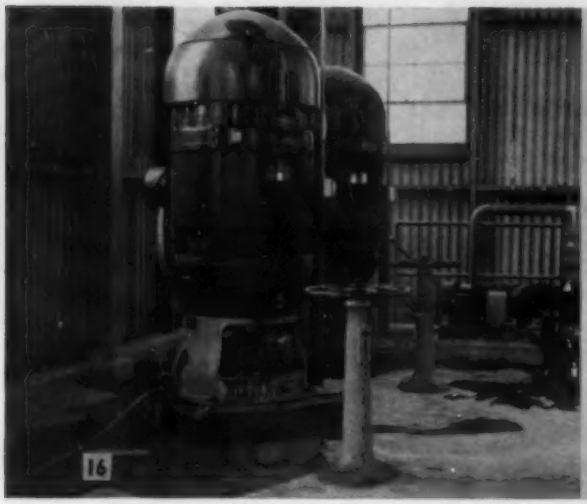


Fig. 3 This is the same 6-roll ironer, now unit trapped. Temperatures shown are also actual pyrometer readings—the average of 329.6°F is 20° higher than with group trapping. This is because air is continually removed from each chest into the drain header, and cannot get back into any chest.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their skills. SPI will carry an article on this "crew-assignment" method of operation in a coming issue.

Engineers and builders of the installation were H. K. Ferguson Company. H. P. Halsell is Resident Manager and Karl Guest is Operations Manager. Executive offices are in the company headquarters located at the Tuscaloosa Mill, only 60 miles distant.

VENDORS OF PRINCIPAL EQUIPMENT

WATER EQUIPMENT

Allis-Chalmers — — Jet Spray Deaerator; Rotary Compressors
American Marsh Pump — — Type V Turbine Pumps
Automatic Sprinkler Corp. of America — — Sprinkler Systems
Chain Belt Co. — — Traveling Water Screens; Rechipper
Chattanooga Boiler & Tank Co. — — Blowdown Tanks; 1st, 2nd, & 3rd
Chicago Bridge & Iron Co. — — Elevated Water Storage Tank
Dixie Steel & Supply Co., Inc. — — Shop Fabricated Tanks
Elliott Co. — — River Water Strainer
Graver Water Conditioning Co. — — Water Treatment System
Ingersoll-Rand Co. — — Pumps
Irby Bros. Machine & Iron Works — — Field Fabricated Steel Tanks and Towers
Proportioneers — — Proportioning Pumps
Wallace & Tiernan, Inc. — — Drinking Water Treatment Equipment
Worthington Corporation — — Water Pumps

STEAM & POWER EQUIPMENT

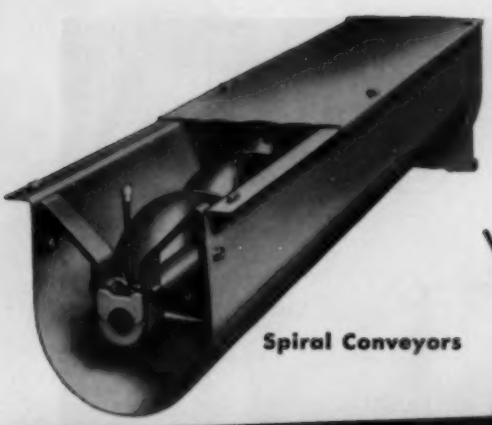
American Blower Corp. — — Air Heater; Forced Draft Fan; Stack
Babcock & Wilcox Co. — — Power & Bark Boilers
Bailey Meter Co. — — Boiler Instrumentation
Brown Fintube Co. — — Tank Suction Heater & Line Heaters
Coen Company — — Kiln Fuel Oil Pumping Set
Detroit Stoker Co. — — Power Boiler Stoker
Diamond Power Specialty Corp. — — Power Recovery Boiler; Soot Blowing System; Shot Cleaning
Electric Steel Foundry Co. — — Digester Heaters
Fisher Governor Co. — — Reducing Valves
General Electric Co. — — 9375 Turbine Generator
Goslin-Birmingham Mfg. Co. — — Sextuple Effect Evaporator
Kerrigan Iron Works, Inc. — — Grating
Lummus Corporation — — High Pressure Heater
Mitts & Merrill — — Bark Hogger
Northern Blower Company — — Cyclone Dust Collector
Patterson Kelley Co. — — Water Heater
Prat-Daniel Corp. — — Induced Draft Fan
Rosenblad Corporation — — Heat Exchangers
Ross-Midwest Fulton — — Paper Machine Condensate System
Schutte and Koerting Co. — — Water Heaters
Stock Equipment Co. — — Cool Valves
United Conveyor Corp. — — Ash System
Western Precipitation Corp. — — Dust Precipitator
Westinghouse Electric Corp. — — Motors; Turbine Drives; Control Equipment; Switchgears

HANDLING EQUIPMENT

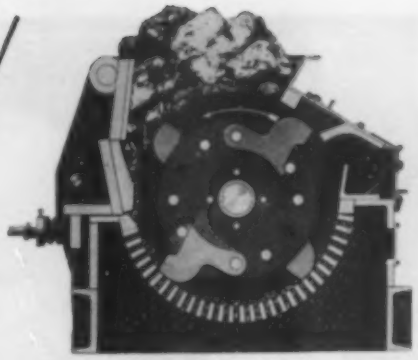
American Hoist and Derrick Co. — — Stiff Leg Derrick
Baldwin-Lima-Hamilton Corp. — — Pulp Bale Press
Builders-Providence, Inc. — — Weighers
Clyde Iron Works, Inc. — — Car Pullers; Derrick Hoist
Dempster Bros., Inc. — — Ford-800 Truck-Dempster Dumpster; Settling Basin
Dings Magnestic Separator, Inc. — — Pipe Line Magnet
Jeffrey Mfg. Co. — — Conveyors
Lamson Corp. — — Finishing Conveyors
Link-Belt Company — — Wood & Pulp Conveyors
Mathews Conveyor Company — — Layboy
National Conveyor & Supply Co. — — Conveyors
Otis Elevator Co. — — Elevators
Reading Crane & Hoist Corp. — — Overhead Cranes
Signode Steel Strapping — — Automatic Wire Tying Machine
Orville Simpson Co. — — Chip Screens
Southern Corporation — — Log Grapples
Syntron Company — — Chip Bin Vibrators
Wellman Engineering Co. — — Locomotive Crane
Yale & Towne Mfg. Co. — — Fork Lift Truck

GENERAL PRODUCTION EQUIPMENT

R. P. Adams — — Sulphuric Acid Filter
American Pulverizer Co. — — Salt Cake Washer
Bauer Bros., Inc. — — Disc Refiner
Beloit Iron Works — — Pulp Drying Machine
Bingham Pump Co. — — Liquor Circulating Pumps
Carthage Machine Co. — — Norman Chipper; Wood Splitter; Barking Drum
Chemical Linings, Inc. — — Tile Tank Linings; Washer Vats
Chemipulp Co. — — Sulphur Pump; Sulphur Burner
Croll-Reynolds — — Chill Vactor for Chlorine Dioxide Plant
Deurik Shower Co. — — Consistency Regulators
Dorr-Oliver, Inc. — — Causticizing System
Falk Corporation — — Gear Reducers
Foxboro Company — — General Instrumentation
Improved Machinery, Inc. — — Washing, Screening & Bleaching Equipment
Industrial Air Co. — — Air Systems
Industrol Corporation — — Instrument Air Dryers
Internantional Harvestor Co. — — Auxiliary Drive for Lime Kiln
Kamyr, Inc. — — Continuous Digester System
Leeds and Northrup — — Lime Kiln Instrumentation
Mathieson Chemical — — Chlorine Dioxide Manufacturing System
Mixing Equipment Co., Inc. — — Agitator for Dissolving Tank
Morden Machines Co. — — Slush-Maker Pulper
Nash Engineering & Research Corp. — — Vacuum Pump; Sulphur Dioxide Gas Blower
Nichols Engineering & Research Corp. — — Vorjet Pulp Cleaners
Pfaudler-Permutit, Inc. — — Glass Lined Tank
Roberts Filter Mfg. Co. — — Filters
Standard Oil Co. — — Lubricating Oil
Traylor Engineering & Mfg. Co. — — Lime Kiln
Viking Pump Co. — — Tall Oil Pumps
Warren Pumps, Inc. — — Stock & White Water Pumps

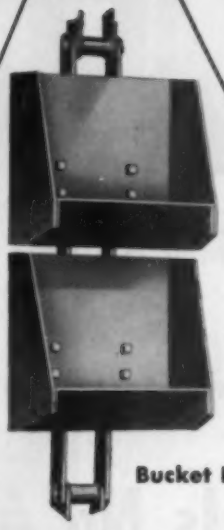


Spiral Conveyors

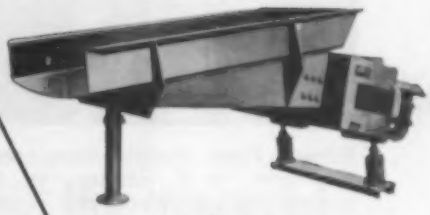


Flextooth Crushers

Scraper Conveyors



Bucket Elevators



Electric Vibrating Feeders

JEFFREY DEPENDABILITY counts most in equipping and operating a power plant

A high standard of design, materials and workmanship has made Jeffrey coal and ashes handling equipment the choice of leading power plant engineers. Whether you're planning a complete plant or revamping an old one, consider these Jeffrey products—

Spiral Conveyors for distributing coal to bunkers and hoppers are ideal where space is limited and capacity demands are not high. Coal can be discharged at any point by means of valves in trough bottoms. Available in various standard lengths.

Flextooth Crushers reduce lump coal to uniform sizes in a single operation, assuring maximum efficiency for mechanical stokers. An adjustable breaker plate permits making a wide range of sizes.

Electric Vibrating Feeders regulate flow to belts, elevators, pulverizers, weigh hoppers, etc., drawing feed from track hoppers and storage bins. Operate on the level, up or down grade. Impart no vibration to supporting structures. Capacities up to 600 tons per hour.

Bucket Elevators provide continuous handling of coal and ashes at low cost and require a minimum of space. Jeffrey furnishes elevators in various heights and in capacities of 25 to 40 tons per hour. Certain types can be employed for elevating and also for distributing coal to bunkers.

The Scraper Conveyor is one of the simplest of conveying units. Flights of various shapes, attached to either single or double strands of chain, drag the material in a steel trough. Operation may be horizontal or on an incline.

Detailed information on Jeffrey equipment for power plants is available upon request. The Jeffrey Manufacturing Company, Columbus 16, Ohio.

JEFFREY

CONVEYING • PROCESSING • MINING EQUIPMENT
TRANSMISSION MACHINERY • CONTRACT MANUFACTURING

Roswell Plant Maintenance crew: Left to right: Albert Thornbro, Leon Cullins, Robert Redmann, W. E. Sanders, W. P. Miller, and Cecil L. Rockhold. Awards on table in foreground include three yearly awards for 1951, 1952 and 1953 and behind them the "permanent" trophy.

New Mexico Plant Completes Seven Years – No Accidents

Safety Is No Accident

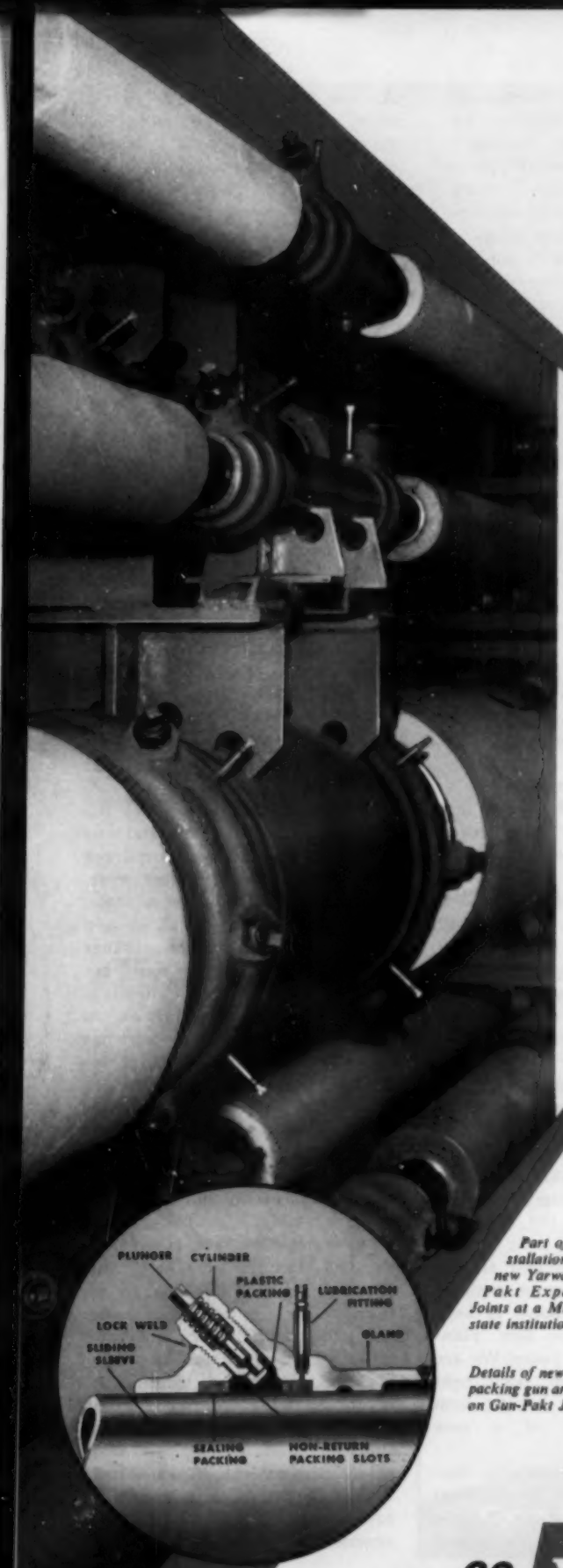
By BOB McALLISTER
Roswell Power Plant
Southwestern Public Service Co.
Roswell, New Mexico

SAFETY is no accident! It's a policy, a characteristic and a business. A business? Yes, safety is everyone's business — not just a passing fancy, here today and gone tomorrow. We learn to work and live safely just as we learn a new job. We acquire safe working conditions every day by putting into practice the "Rule Book" and our own common horse sense. We live safety and breathe it. Even though we are sometimes unaware of it, we are constantly in a world surrounded by hazards, booby traps and death traps that are just every day living and part of our environment. Whether it be at home, at work or at play we are faced with hazards that may at any moment turn into an accident.

This story deals with the Roswell Power Plant and our SEVEN YEARS without an accident. But we all know that we have not succeeded in making ourselves immune to accidents. We were very fortunate to acquire this record. Although we are very proud of this achievement we are certainly not going to stop to pat ourselves on the back and, possibly, break an arm doing it.

We don't consider ourselves any different from any other group of people or other departments in our Company. Let's put it this way. We feel our main concern is for the well-being of our fellow workers. We work to go home each night with all of our fingers, toes, arms and legs. In this way, we have no painful after-effects and no regrets. We can have peace of mind by knowing we had no part in someone getting hurt or injured in any way.

To help us along our line of thinking, we have our safety meetings once each month. Through these meetings we are free to speak our minds and bring out any unsafe or hazardous practices that might have occurred during the past month. If we have seen a hazard in the plant that could very easily have caused an accident, we



Part of an installation of 37 new Yarway Gun-Pakt Expansion Joints at a Mid-West state institution

Details of new packing gun arrangement on Gun-Pakt Joints

something great has happened to steam lines..

..the improved GUN-PAKT EXPANSION JOINT

With the many types of expansion joints available today for steam lines, it's important for engineers to "know their joints" when making a choice. Engineers know that Gun-Pakt maintenance costs have *always* been exceptionally low.

NOW . . . with the new Yarway Type W Gun-Pakt expansion joint you have these important *added* advantages—

CONVENIENCE—improved angle of packing guns makes them more accessible, thus reducing maintenance costs.

INCREASED STRENGTH—thanks to new one-piece integral body and gland.

LOWER MAINTENANCE—new packing gun design permits injection of special plastic packing *directly into packing space under full steam pressure. No need for costly shut-downs for repacking.*

Now is the time to find out more about Gun-Pakt joints. Write for Yarway Bulletin EJ-1916.

YARNALL-WARING COMPANY
Home Office: 116 Mermaid Avenue, Philadelphia 18, Pa.
Southern Representative: Roger A. Martin
Bona Allen Bldg., Atlanta 3, Ga.

GO YARWAY WITH CONFIDENCE

speak up so this hazard will be eliminated.

Our Safety Supervisor, Mr. Acie Cates, brings us facts and figures that we discuss. He has various programs such as safety films and demonstrations to help us. He helps us in many ways to be always on the alert for unsafe practices. We also discuss what to do in case of an accident or fire. We have a meeting chairman who conducts each session. Every quarter we elect two new Safety Observers who make monthly reports on hazards that they have observed.

Of course this isn't the only time we think of safety. During our morning coffee breaks, and at other times, we often discuss our problems. We don't hesitate to mention that there are jobs that acquire additional tools or equipment to do a better job *safer*. This is where our supervisors come in. We know they, too, can make or break our safe working standards. We are very fortunate in this respect as we have supervisors who are genuinely interested in safe working conditions for their employees and co-workers. Our immediate supervisors are G. R. Maxwell, Plant Manager, and C. G. Brown, Assistant Plant Manager.

Our plant employees feel that no job needs to be done so hurriedly that they shouldn't take a few seconds to stop and think and plan what they are going to do. This is an important part of the job they are about to do. Do the work safely and you'll be doing it right. We have a crew of safety minded foremen, both in operations and maintenance, that encourage making every job a safe job.

The foreman helps by putting himself in the place of his fellow workers. Our senior plant employee and operating foreman, Bill Lewis, started out as Auxiliary Operator September 28, 1939, and has never had a reportable accident. A record like this is to be admired and copied.

Our Maintenance Foreman, W. E. Sanders, in his 13 years at our plant as Maintenance Foreman, has never had a lost-time accident under his supervision. He believes that this is due to the continuous cooperation between members of the entire crew. One Maintenance Journeyman, Leon Cullins, has never missed a safety meeting in his five years of service. These are just a few illustrations of things that have contributed to our success as a safe operating plant.

We credit a portion of our success to good housekeeping. This plays a tremendous part in maintaining a safe plant. All of our plants over the system are engaged in a "Good Housekeeping" contest. Each month the winning plant receives the "Best Kept Plant" flag and keeps it until another plant wins the award. We won this flag in October of 1956. It, of course, stands to reason that any job can be done much better if there is no trash, debris or odd tools around to stumble over.

The "Plant Safety Contest" has played a large part in our record. This contest began in January 1951 and includes all plants in the Company. Not only has the Plant Safety Contest acquired great interest among plant employees, but it has proved beneficial in furthering outstanding progress in safety. It keeps our mind on safety and causes us to look forward each month to see how we stand on the report.

The Plant Safety Contest is based on accidents, and safety meeting attendance (percentage wise). One year our meeting was split up in two sides to bring up our attendance. The side that lost furnished and cooked the breakfast for the other side. This created interest in our meetings. Everyone enjoys a contest. It is something to work for and, especially, to enjoy when your plant is on top in the final results.

Then comes the big steak dinner at the end of the year for the employees and their wives. The trophy is presented to the winning plant, where it remains for a year. The trophy is kept permanently by the first plant which wins it three years. We are proud to have one permanent trophy, as well as having won temporary custody of a new trophy.

Yes, we won the trophy four out of six years and finally kept it in 1955. But I think it goes deeper than that. We know that we are helping our Company while we are helping ourselves and our families have a better life. There is no place in a plant or industry for carelessness. We look to the future of our Company, ourselves and our families when we work safely.

Our Operations Department consists of 18 men and there are 8 men in Maintenance. They are ready and willing at all times to be good neighbors and good, safe workers. Many times you hear someone say, "There goes an accident going somewhere to happen!" or "He is just accident prone." In checking up, however, we find these particular people work carelessly and act before they think, instead of "Stop, think and then act." It depends entirely on the individual whether the job will be done safely and how he feels before he starts. We are *proud* to say that we have worked several thousand man-hours without a reportable or lost-time accident simply because we feel it is our duty.

Our last lost-time accident occurred on April 7, 1950, and our last reportable accident occurred on April 29 of the same year. We can't help but boast a little, but it still behooves us all to stop and consider at all times whether we know what we are doing before we do it. We ask ourselves if the tools we are using are in good condition, if the job has been planned sufficiently, if we are prepared for this particular job. We are determined that, after the job has been completed, we will be able to walk away in one whole piece and say, "A job well done — I'm proud that I was able to do it safely."

Of course we can't overlook the fact that the man in the firing aisle must know his air-gas ratio before lighting off a boiler and the switchboard operator must be alert when an alarm goes off, indicating trouble. All of these and more must tie directly into the line of quick thinking and doing the work safely. Regardless of what it is, who it is, or where it is, any job can be ACCIDENT-FREE if everyone will do his part.

Engineers and Consultants— *Gilbert Associates, Inc.*
READING, PA.

Coal Handling Equipment by *Continental*

The Urquhart Station of the South Carolina Generating Company, a wholly owned subsidiary of South Carolina Electric and Gas Company, at Beech Island, has been in operation since 1953. The complete coal handling system was furnished and erected by Continental Gin Company, including all Machinery, Crushers, Breakers, Car Shakeout, and Structural Steel.

Another example of Continental's cooperation with leading consultants on conveyor design, fabrication and erection. Call on your nearest Continental office for assistance.

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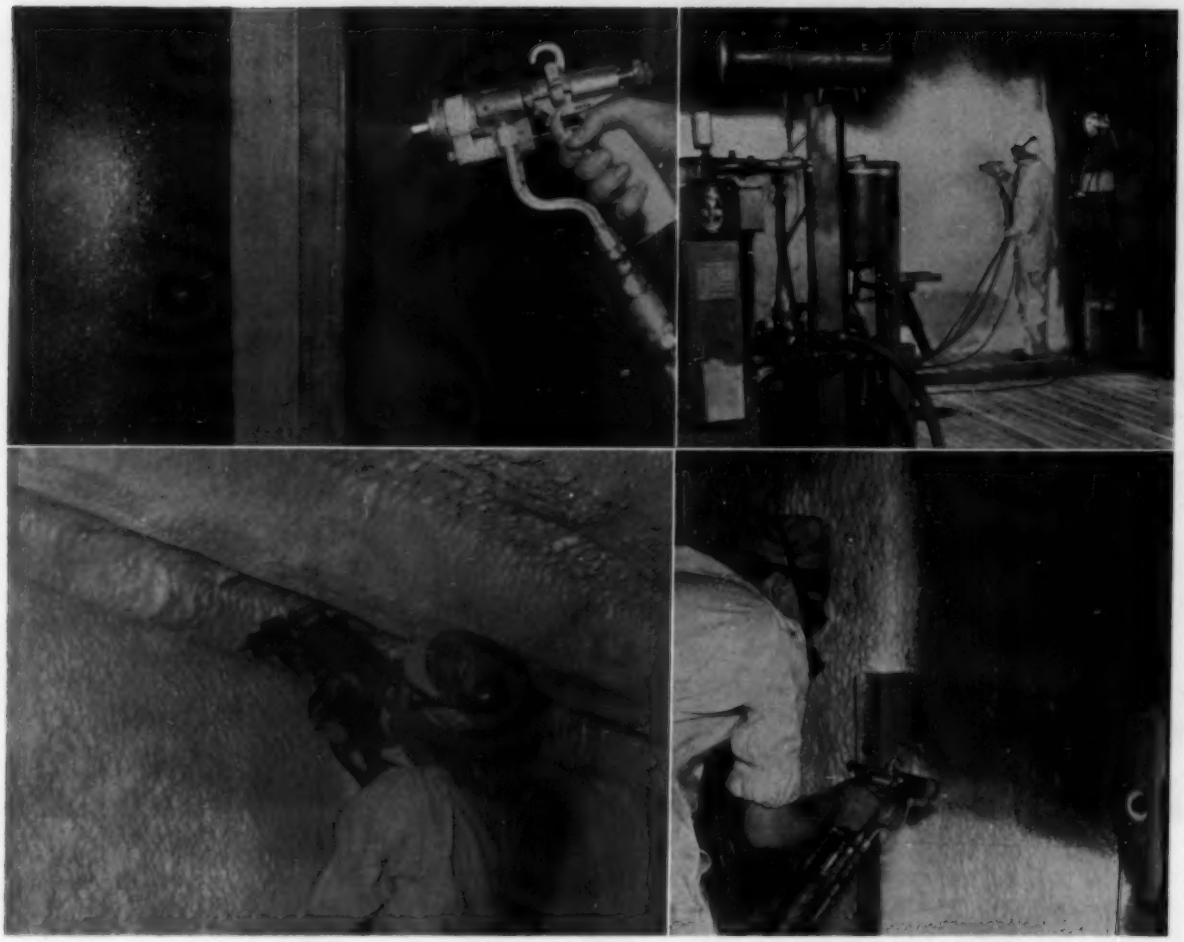
INDUSTRIAL DIVISION

Continental Gin Company

BIRMINGHAM, ALABAMA



Successful spraying method . . .

URETHANE FOAM INSULATION

SUCCESSFUL spraying of urethane foam insulation on the walls and ceiling of a building was recently demonstrated at the Du Pont Company's Chambers Works. Equipment, developed by Minnesota Mining and Manufacturing Company, was used to insulate a new ice house 49 ft long, 25 ft wide and 9 ft high. Application took six days of spraying time.

The unique characteristics of the new spraying equipment are the mixing chamber in the spray gun itself and the proportioning of the material from the intricately engineered metering apparatus. This metering equipment is attached to the spray gun by three separate lines, one carrying the prepolymer, another for the catalyst, and the third for air.

Flow of the material can be controlled accurately to one-half of one per cent. The proportioned materials are mixed in the small chamber of the gun in about 1/30 of a second, picked up by the atomizing air, and sprayed out to foam up against the surface. By pushing a button the operator can shoot foam from the gun in a continuous stream for foaming-in-place operations. The mixing and proportioning equipment has a device for recirculating the material to prevent the spray from becoming clogged during idling.

Urethane foam has already been used to insulate pipes and tanks of all sizes. While material costs are higher than conventional insulation, savings in application time usually result in a lower over-all cost.

TOP PHOTOS — Cement block, coated with a mastic as a vapor barrier, is being sprayed with a urethane foam spray gun. Photo at right shows metering and pumping equipment. Ice house is 49 ft long, 25 ft wide and 9 ft high.

LOWER PHOTOS — Foam has been sprayed to a thickness of 2 in. on the ceiling. Hard to get at surfaces can be easily reached. Photo at right shows three lines leading to spray gun, carrying the prepolymer, a catalyst and air for atomizing the material. Material is mixed in the gun.

Shown above are two Iron Fireman RFA-60 burners and Titusville boilers in operation at the New York Telephone Company, New York, N. Y. Burners are forced draft for firing oil. Mr. Edward L. McHugh, Building Maintenance Supervisor of the New York Telephone Company states, "Dependable, uninterrupted service and minimum maintenance has characterized the operation of these burners." Architect: Vorhees, Walker, Smith and Smith, New York; Consulting Engineer: Syska & Hennessey, New York; Heating Contractor: Jarcho Bros., Long Island, N. Y.

Iron Fireman Boiler-Burner Units Offer You These Advantages

Easy to size and specify. After deciding on the fuel (gas, oil or gas-oil dual fuel) and determining the required load, it is only necessary to refer to a simple chart to find the correct size of boiler-burner unit for your job.

No high stacks — no high ceilings. Forced draft eliminates costly and unsightly stacks. Compact boiler requires little headroom.

Low installation cost. Installation costs are low. No special boiler setting; no intricate wiring (factory wired and tested control panel is part of the unit); no complicated piping; no on-the-job refractory work. Factory engineering throughout assures exceptional fuel economy. Models for any type of high or low pressure gas, or any grade of oil from No. 2 to low cost No. 6.

Separate firing units available for all types of boilers. The Iron Fireman forced draft burner is a complete firing system which requires little, if any, firebox alteration, no pit for underfloor air, no ignition arch. Easily applied to new or existing boiler settings.

Send for catalog with complete specifications

IRON FIREMAN.

AUTOMATIC FIRING EQUIPMENT
FOR OIL, GAS, COAL

IRON FIREMAN MANUFACTURING COMPANY
3123 West 106th Street, Cleveland 11, Ohio.
(In Canada, 80 Ward Street, Toronto, Ontario.)

Please send information on following equipment:

- ☐ Complete boiler-burner units.
- ☐ Forced draft firing units.

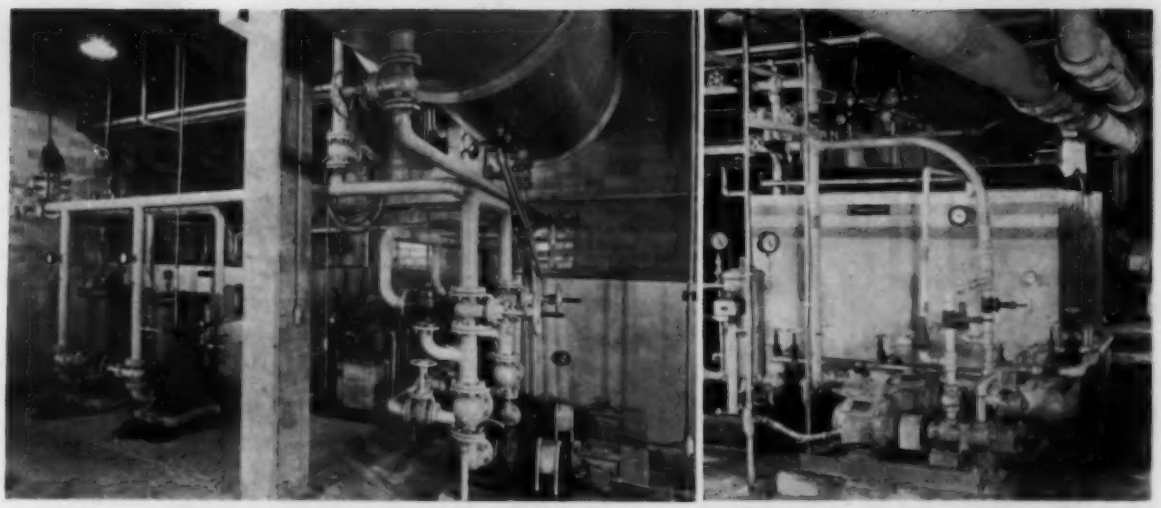
Name_____

Firm_____

Address_____

City_____ Zone____ State____

For more information, use Reply Card—Page 97



Bowaters' three high speed paper making machines and 14 wood grinders are each lubricated by Dravo-DeLaval systems. LEFT — Equipped with micronic filters, centrifuges and pumps, the system for the paper machines feeds the oil under accurately controlled pressure and temperature to countless bearings and gear mesh points. RIGHT — Close-up view of system supplying the grinders.

LUBRICATION FOR BIG MACHINES — — Calhoun, Tennessee

PAPER making machines, which in the past three years have produced enough newsprint for an estimated 55 billion, 28-page newspapers are still running on their original oil supply in the new plant of Bowaters Southern Paper Corporation at Calhoun, Tennessee.

Vital to this high speed production — almost a mile and a half of paper, 22 feet wide, per minute — are four custom-engineered Dravo-DeLaval mill lubrication systems. Complete with filters, centrifuges and pumps, the systems feed, clean, dry oil under accurately controlled pressure and temperature to countless bearings and gears.

Three of the lubrication systems at Bowaters are installed on dryer roll sections of three Beloit Fourdinier paper making machines, while the fourth lubricates 14 Great Northern Waterous pulp grinders. Six of the grinders are individually powered by 6,000 hp sychronous motors and eight are powered by 4,500 hp motors. Each Beloit machine requires a total of 2,400 hp for the three dryer sections.

Oil from each of the four systems is tested every six months. And after producing some 400,000 tons of newsprint, the lubricants have shown no change in viscosity, no oxidation, no water content, and no acidity.

This lubricating performance is directly attributed to the operating efficiencies of the highly complex oil circulating systems. As each of the three systems on the dryer roll sections alone contain 15,000 gallons of lubricant, this performance, when translated into dollars, is extremely significant in overall operating costs.

Anti-friction bearings, gear mesh points and idler shaft bearings on the dryer rolls of two of the machines, in service since the plant was started, are lubricated with 600 SSU oil at 100 F at a flow rate of 60 gpm. A third machine of increased capacity and of newer design is lubricated with 600 SSU oil at a flow rate of 70 gpm.

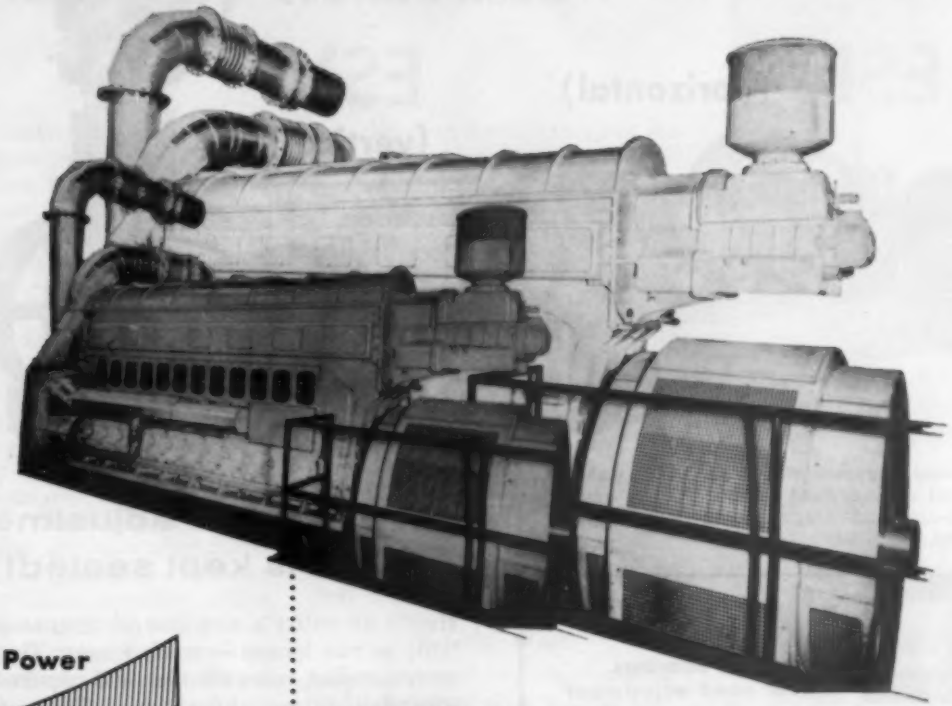
Anti-friction bearings on the 14 pulpwood grinders are lubricated with 600 SSU oil at 100 F pumped into the system at the rate of 7½ gpm and under pressure of 50 psi.

All four systems are equipped with micronic filters with inert replaceable cartridges capable of removing abrasive dirt particles and paper dust as small as one micron from the oil flow. Each system has two filters, hooked up in parallel, through which the oil is pumped on its return from the supply tank to the anti-friction bearings and gear mesh points of the machine.

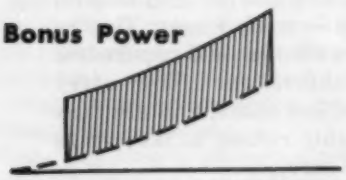
Water and other impurities from various sources that collect in the lubricating systems are removed by DeLaval purifiers.

THE ATOMIC SOUTH has been a pioneer in nuclear education and current expansion of atomic industries offers a firm basis for most optimistic predictions for the future. See pages 6-12.

50% More Power with Fairbanks-Morse
TURBOCHARGED OPPOSED-PISTON DIESEL

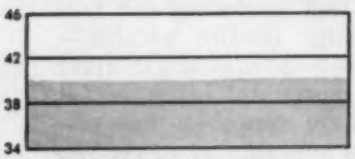


Bonus Power



Auxiliary blower is automatically declutched at loads above approximately 1/3 rating to deliver more usable power at the flywheel.

Increased Thermal Efficiency



Turbo-charged Fairbanks-Morse Model 38TD-8 1/8 Opposed Piston Diesel is approaching a new high of 40% efficiency.

New Efficiency...New Power...New Fuel Savings For Marine and Stationary Applications

The industry's most compact, simple, and dependable diesel—the Fairbanks-Morse Opposed Piston—*is now turbo-supercharged!* Fuel savings from 5% to 10% are effected on full-load operations—even more on part loads. And 50% more power has been added. At 900 rpm, for example, it is conservatively rated at 300 hp per cylinder. Yet it occupies vitually the same space as the non-supercharged version...weighs only about 8% more. Look at the advantages in this usually low size and weight per horsepower.

Stationary installations—save on foundation and building costs.
Commercial marine use—more power, speed, fuel and cargo capacity.
Portable operations—save with most compact power available today.

Greater power is available at higher altitudes because the engine is less sensitive to atmospheric pressure. Oil and water cooling requirements show almost no increase at the higher output. It's all possible with careful matching of system and engine. Divided manifolds permit use of exhaust pulses with no pressure cancellations. Engine-driven auxiliary blower provides scavenging air up to ⅓ load—declutches above this figure to make additional power available at flywheel. For full information write Fairbanks, Morse & Co., 600 S. Michigan Ave., Chicago 5, Ill.

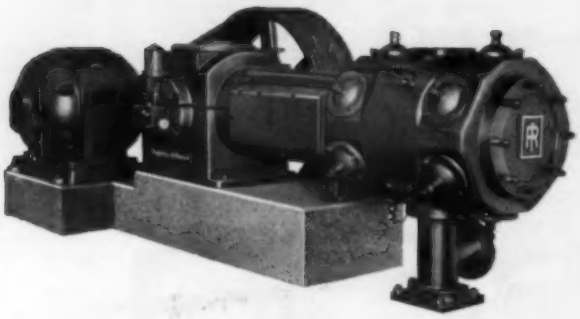
FAIRBANKS-MORSE
a name worth remembering when you want the BEST

DIESEL AND DUAL FUEL ENGINES
DIESEL LOCOMOTIVES • RAIL CARS
ELECTRICAL MACHINERY • PUMPS
SCALES • HOME WATER SERVICE
EQUIPMENT • MAGNETOS

NEW COMPRESSORS

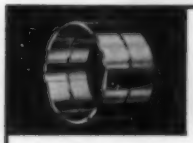
...with heavy-duty features proven in larger Ingersoll-Rand compressors

ESH* (horizontal)



ESV* (vertical)

*The same compressor in either horizontal or vertical arrangement – 20 to 150 hp sizes, single-and multi-stage, pressures up to 5000 psi and vacuums.



Full-floating aluminum bearings never need adjustment

The full-floating bearings "roll with the punch," taking each thrust on a different portion of the shell. They are foolproof, and never require fitting or adjustment. Main and crankpin bearings are made of I-R's special aluminum bearing alloy, which has higher load capacity and better heat conductivity than other bearing materials.

Air-cushioned Channel Valves give unmatched performance

Known the world over for lasting efficiency, dependability and quiet operation, Ingersoll-Rand air-cushioned Type A Channel Valves are entirely different in design and principle from any other valves in use. Type A Channel Valves were developed especially for modern compressor speeds, and feature a separate stainless-steel seat plate which can be reversed or replaced for new life.

Never a need for adjustments– frame is kept sealed!

Here's an entirely new line of compressors, built to run longer — much longer. They're more compact, more efficient, and require less attendance, less maintenance. They offer greater capacity in less space, and are ruggedly built and highly refined to take years of continuous hard service.

All running parts are precision-machined and need no fitting or adjusting, so the frame is sealed — dirt stays out, and the major causes of wear are eliminated!

There are many design features—including filtered force-feed lubrication and full-floating self-adjusting metallic packing — that have heretofore been found only in larger Ingersoll-Rand compressors. Let your I-R representative tell you more about these new compressors, and how they can save you money.

Ingersoll-Rand

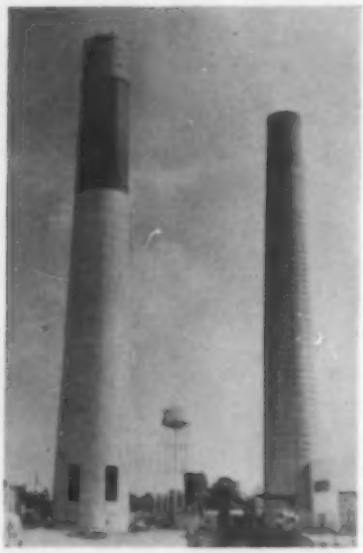
I-815 11 Broadway, New York 4, N.Y.

In engineered products, there's no substitute for experience!

COMPRESSORS • GAS & DIESEL ENGINES • PUMPS • AIR & ELECTRIC TOOLS • CONDENSERS • VACUUM EQUIPMENT • ROCK DRILLS

Major troubles & repairs . . .

Chimney Renovated



Duct and flue system diverts waste gases to either new (left) or old chimney. This permitted shut down for inspection and repairs.

FOR a number of years a synthetic fibre manufacturing plant in Alabama had been discharging its exhaust and waste gases into a brick chimney 200 ft high. The chimney had an acid resisting masonry lining and an asphaltic membrane between the outer column and the lining, but a few years ago staining of the exterior of the chimney became very pronounced and numerous vertical cracks appeared in the outer column.

It was obvious that the lining and membrane were no longer effectively containing the acid, solvent, and moisture-laden fumes being discharged under pressure, and that major corrective action could not be deferred much longer if the chimney was to retain its structural and functional soundness which was absolutely necessary to uninterrupted manufacturing operations.

At this time a planned expansion of the plant's manufacturing facilities had just been approved. This expansion included a second chimney, and the following program was developed to permit uninterrupted plant operations:

1. Make immediate exterior repairs to the present chimney, and start construction of the second chimney at once, giving special consideration to the design of the new chimney and to the materials of construction to be used in light of the trouble that had been experienced with the first chimney.

2. Install a duct and flue system with provisions for diverting all of the waste gases to either chimney. With this arrangement one chimney could be shut down for inspection and repairs while the other discharged all of the exhaust gases for a short period of time.

3. When the second chimney and the new duct and flue system had been completed, take the first chimney out of service, make a careful interior inspection, and then perform such addition repairs and/or alterations that would prolong the useful life of the first chimney.

This discussion will cover the two stages of the repair program to the first chimney, but will not describe the design and construction of the second chimney.

Exterior Work

The exterior repairs consisted of (1) installing 4" x ⅜" lead covered steel bands on 3'0" centers from a level just above the flue openings to a level 30 ft below the top of the chimney, and (2) cutting out and cleaning all exterior cracks and then pointing them with a phenol-formaldehyde type acidproof resin cement to which finely ground quartz had been added to reduce shrinkage of the mortar which takes place when it sets.

The outer brick column was constructed of standard hard burned perforated radial chimney brick laid in portland cement-sand mortar tempered with fireclay, except in the upper 30 ft where a resin acidproof cement was used to repoint the exterior joints immediately after the chimney column was completed. Good design of a chimney discharging corrosive fumes or gases will provide for protection of the top of the exterior surface of the chimney from corrosion that can result from downwash of fumes under adverse atmospheric conditions. At the time the plan was formulated, the upper 30 ft of this chimney did not contain cracks nor was there pronounced staining of the exterior in this area, so banding of this portion of the chimney was not considered necessary.

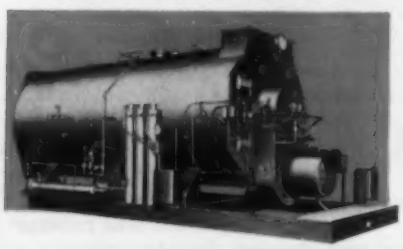
Interior Repairs

Later, when the chimney was taken out of service to permit an interior inspection, it was discovered that a shifting of the lining in the upper 50 ft had rendered the asphaltic membrane ineffective and condensate was penetrating through the lining, running down the partially void annular space between the outer column and lining, and then working its way through the outer column causing the mortar to "sulphate." This "sulphation," or attack of the portland cement mortar causes swelling of the masonry and results in cracks. It is probable too that the solvent in the condensate was gradually dissolving the asphaltic membrane.

It was also found that three serious horizontal cracks had formed in the upper half of the chimney, and that these cracks existed in both the outer column and lin-

The Flexible Steam Generator that Allows for Tomorrow's Growth

The installation of one Cyclotherm often leads to the installation of several more, because they're designed for the needs of tomorrow as well as for the needs of today.
Only Cyclotherm gives you added steam capacity in units ranging from 15 HP to 750 HP, with 18 sizes to choose from. Cyclotherms fit boiler-room space—they're up to ⅓ smaller than other Package Boilers. They need no foundation, no excavation, no costly stack. Cyclotherm Steam and Hot Water Generators come to you complete—ready to work—with one manufacturing responsibility back of the entire equipment. Cyclotherm's Cyclonic Combustion guarantees a minimum of 80% efficiency. Maintenance costs are cut by up to 50%.



And only Cyclotherm manufactures a specially designed line of Package Hot Water Generators, in capacities ranging from 670,000 BTU per hr. to 6,700,000 BTU per hr. Send the coupon below and a Cyclotherm Sales Engineer will promptly call.

Seven Cyclotherms Installed Without Interrupting Steam Supply!

Here's how H. D. Koblitz, Cleveland property management company, changed steam generators without interrupting steam supplied to 365,000 sq. ft. of plant area. On a balcony over the fire aisle, they installed 4 Cyclotherms while the old installation still operated. Then they dismantled the old boilers, putting 3 Cyclotherms in their place. A complete new installation, without one second's loss of steam!

YEARS AHEAD IN STEAM & HOT WATER GENERATION
CYCLOTHERM
STEAM AND HOT WATER GENERATORS
A Division of National-U.S. Radiator Corp.
51 E. First St., Oswego, N. Y.

Clip to Your Letterhead:

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Please send me free 4-page folder on Cyclotherm Steam and Hot Water Generators.

ing. Several minor vertical cracks were discovered in the upper 30 ft of the exterior surface.

As a result of these inspection findings, it was decided to perform the following additional repair work:

1. Continue the banding to the top of the chimney to prevent the possible formation of serious vertical cracks in this area in the future.
2. Cut out, clean, and point the three horizontal cracks in the exterior with resin cement and ground quartz.
3. Sand blast the upper 60 ft of the interior, and cut out, clean and point the three interior horizontal cracks with resin cement and ground quartz.
4. Wash the upper 60 ft of the interior surface with weak muriatic acid, jet dry the surface, and then apply a special Epoxy coating ⅛" thick.

This work was completed in January, 1958, and the renovated chimney should, with a minimum of routine maintenance, provide many more years of useful service.

By ARTHUR M. CLARK, Chief Engineer, Custodis Construction Co.

Air Buck Riveter

A MILL in North Carolina has a centralized shop for maintenance of brake bands and box extensions for Draper looms. Part of this operation involves fastening brake shoes to bands with nine ⅛" copper rivets, and fastening leather faces to box extensions with three 1/16" copper rivets. The rivets were being upset by ball peen hammers which caused a delay in getting the parts into service and slowed production.

Now that an Ingersoll-Rand Size AR-130 Air Buck Riveter with flush set and yoke attachment is being used to upset the rivets, loom downtime is reduced and production increased.

Ford Motor Co. installs

AMERICAN MONORAIL

in one of . . .

WORLD'S BIGGEST CHROME PLATING PLANTS

Ford Motor Co. has installed an American Monorail system almost 9/10 of a mile long with 4 automatic track switches and 16 automatic lift or dip sections in the track. It serves two Udylite automatic plating machines, each of which is approximately 750 feet long.

A 3-ton Monorail system feeds carriers loaded with Ford bumpers into each plating machine and removes the carriers at the finished end.

Everything is automatic with provision for manual control at critical points.

This is another typical example of cooperation between Monorail, Udylite, and Ford engineers.

AMERICAN MONORAIL

ENGINEERED MATERIALS HANDLING

OVERHEAD HANDLING EQUIPMENT

13105 ATHENS AVENUE
CLEVELAND 7, OHIO

MEMBER OF MATERIAL HANDLING INSTITUTE AND MONORAIL MANUFACTURERS ASSOCIATION

Tungsten carbide contacts save $5,500 a year for N. C. plant . . .

Electrical Relay

Left to right, standard contacts; bar with standard contact removed; and tungsten carbide contact.

WE USE a number of electrical relays which furnish power to magnetic clutches. The action of the relays must be positive and without failure because the pattern in the material produced would be ruined if the relay failed to operate on schedule and if the contacts failed to release when the power is interrupted.

An indexing wheel which sends signals to the relay is set to operate the relay about 30 times a minute.

Our maintenance on relays became expensive because the standard contact of silver became burned and distorted by the d-c current used. Standard procedures were observed in retarding the arc by using a condenser, but the life of standard contacts was only two weeks. They had to be cleaned after the first week of operation and replaced after the second week.

Cost of the standard contacts was $1.50 per unit, plus $1.17 for installation, making a total of $2.67 per week for each unit. A period of 26 weeks showed a cost of $69.42 per unit for 40 units, making a total cost of $2,776.80 for operating them 6 months.

We installed tungsten carbide contacts with excellent results. After considerable use, there is no distortion or wear visible.

Cost of the tungsten carbide contacts per unit is $.60, installation cost is $1.17, and total cost per unit is $1.77. Cost for 40 units is $70.80, thereby effecting a saving of $2,706.00 for a period of 6 months.

Even assuming that the new contacts will last no more than a year (which seems conservative) our savings should amount to over $5,000 per year.

We Make Our Own

At times it has been difficult to obtain tungsten carbide contacts. We have also tried a different type of contact which may operate as effectively as the carbide type. Using low carbon steel rod (S.A.E. 1025), we turn the contact in a lathe, afterwards using the process of carbonizing and hardening. Cyanide hardening was employed. Our practice is to heat the contact to 1450-1650 F, then dip into a bath of cyanide (sodium).

As soon as the bath extends over contact, it is removed and washed in clear cold water. Any low carbon steel is suitable for this process, and most shops have one of the many types of case hardening procedures available.

The relay manufacturer has adopted the new contact but is able to supply them only with new relays. This is favorable for concerns that are just now entering into this system, but for us it does not help much, except for replacement of relays that wear out.

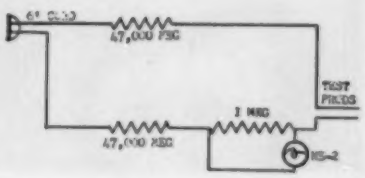
Our newest type of contact has been in operation for about eight weeks with perfect operation (case hardened steel). This greatly exceeds standard contact life, and we believe it will come near the tungsten carbide rating. Our use and conditions of operation do not exceed the heat, voltage, shock, and amperes that tungsten carbide can stand without damage. In further reducing costs, a contact made of steel that is case hardened should serve its purpose as it has done for us these past several months.

By C. D. McALLISTER
Rock Hill, S. C.

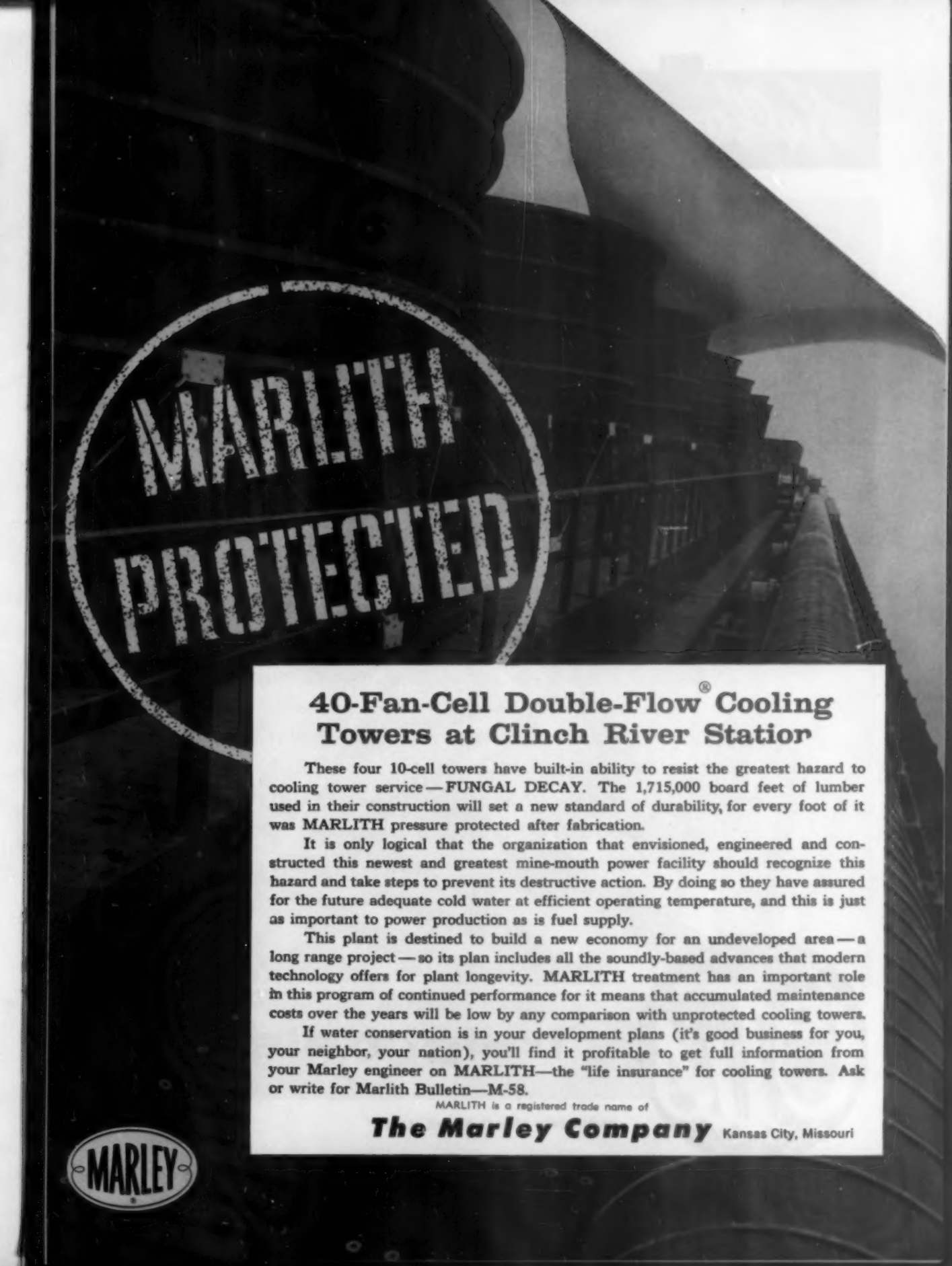
Simple Electrical Tester

WE SUPPLY our maintenance men with a simple tester made at low cost that fits into the pocket. It is safe to use because it has a high-value resistor in each test lead. It makes possible on-the-spot tests without cumbersome equipment.

The entire tester fits into a plastic cigarette case. An NE-2 neon glow bulb is the indicator. The few components are wired onto a piece of asbestos shingle or asbestos paper. As shown in the schematic drawing. Six feet of cord are wired to a plug and test prods through ¼-watt, 47,000 ohm resistors, with a 1 megohm resistor parallel with the neon bulb.



By HARRY J. MILLER
Sarasota, Florida



40-Fan-Cell Double-Flow® Cooling Towers at Clinch River Statior

These four 10-cell towers have built-in ability to resist the greatest hazard to cooling tower service — FUNGAL DECAY. The 1,715,000 board feet of lumber used in their construction will set a new standard of durability, for every foot of it was MARLITH pressure protected after fabrication.

It is only logical that the organization that envisioned, engineered and constructed this newest and greatest mine-mouth power facility should recognize this hazard and take steps to prevent its destructive action. By doing so they have assured for the future adequate cold water at efficient operating temperature, and this is just as important to power production as is fuel supply.

This plant is destined to build a new economy for an undeveloped area — a long range project — so its plan includes all the soundly-based advances that modern technology offers for plant longevity. MARLITH treatment has an important role in this program of continued performance for it means that accumulated maintenance costs over the years will be low by any comparison with unprotected cooling towers.

If water conservation is in your development plans (it's good business for you, your neighbor, your nation), you'll find it profitable to get full information from your Marley engineer on MARLITH—the "life insurance" for cooling towers. Ask or write for Marlith Bulletin—M-58.

MARLITH is a registered trade name of

The Marley Company Kansas City, Missouri

MARLEY®

Kellogg's of battle creek

a name the nation has all freight

You can measure the importance of uninterrupted production at BATTLE CREEK when you picture a daily output of 1,000,000 regular and family size packages of cereals plus 3,000,000 single-service packages.

A vital part of the production line is the uninterrupted performance of 10 OTIS Freight Elevators with lifting capacities ranging from 4,000 to 12,000 pounds. These elevators were installed between 1912 and 1955, yet all are still operating at their original efficiency—because of the carefully "engineered program" that constitutes OTIS Freight Elevator Maintenance.

Equally important as efficient operation is safe operation. It is KELLOGG'S policy to protect its workers to the fullest extent. OTIS Maintenance assures the proper working condition of all safety devices as well as the replacement of all wearing parts in advance of their breakdown point.

OTIS is making an important contribution to the uninterrupted flow of a production line that makes "KELLOGG'S OF BATTLE CREEK" a name that the nation can look for and find every morning.

otis

freight elevator

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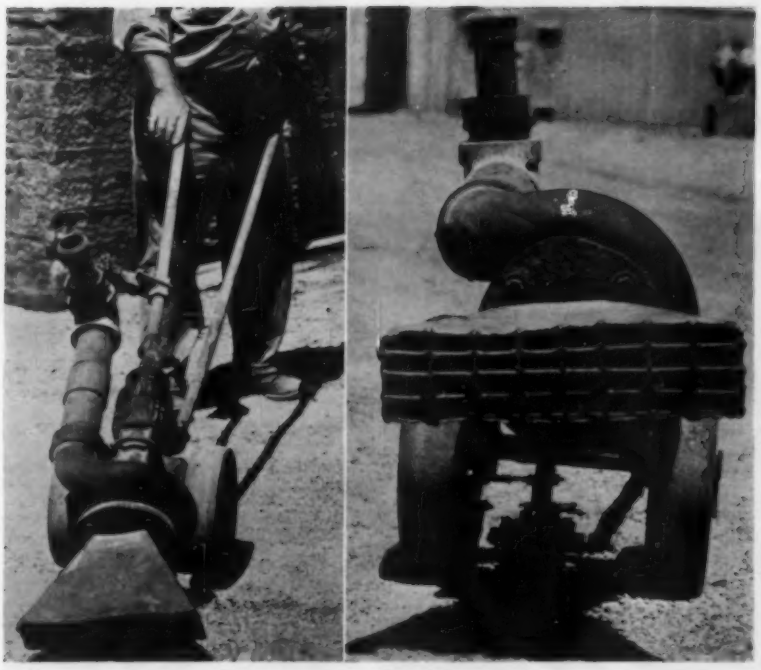
OTIS ELEVATOR COMPANY • 260 ELEVENTH AVENUE • NEW YORK 1, N.Y.

looks for every morning elevators under Otis Maintenance

maintenance that keeps freight elevators running like new

OFFICES IN 297 CITIES ACROSS THE UNITED STATES AND CANADA



Versatile Sump Pump

ANNUAL cleaning of sand and sediment from four feet of water in the 100′ x 500′ basin of a cooling tower took 500 man-hours. A southern chemical corporation had five of these basins to clean each year, and wished to reduce the total 2,500 man-hour cleaning time.

They mounted an Ingersoll-Rand Sump Pump on wheels and made a special fan-shaped inlet with a grill opening. The operator, wearing hip boots, walks along in the basin pushing the Sump Pump in front of him like a vacuum cleaner. Another man guides the discharge and air hoses, and as the hoses float on the surface of the water, he can easily keep up with the first man.

Since it takes only 125 man-hours to clean one basin with the Sump Pump, the company saves 375 man-hours per basin, or 1,875 man-hours per year. At the rate of $2.50 per hour, the Sump Pump rig saves the firm $4,687.50 per year. This versatile, rugged Sump Pump paid for itself in its first 116 hours of operation.

Industrial Lighting

(*Starts page* 38)

and buyers could do a much better job of judging tobacco under artificial lighting than daylight, but it is extremely difficult to convince them of this fact.

For color matching, no one light source will be found satisfactory for all types because some products may have a sheen that can alter its appearance or another may possess fluorescence which may be accentuated under blue light. It is agreed among most lighting experts who have worked in color, that the best method of matching colors is to use two different light sources which vary widely in their spectral characteristics. One should be predominantly blue and the other predominently red. This does not mean a pure blue and a pure red, but a white light with these respective colors predominant. A daylight fluorescent lamp can be used for the predominantly blue light source and an incandescent lamp as the source providing the reddish light. When colors are viewed first under one and then switched to the other, a good match can be obtained.

Another factor involved in color matching is the level of illumination. For most cases levels of from 200 to 400 foot-candles are desirable. If the materials have dark colors, as much as 1000 foot-candles may be necessary. The source of light should be relatively large in area and of uniform brightness.

This brief discussion of color matching cannot possibly enumerate in details the many factors involved where true color rendition or matching is required. The best method is to consult a lighting engineer who has worked with and knows color and who can appreciate the viewpoints of workers who have developed their own ideas and methods.

With all of the light sources and lighting equipment available today there should be no industrial seeing job that need be poorly or improperly lighted. Some situations are more difficult than others, but there are few cases, if any, where light cannot play an important part in being a tool for production.

How to Avoid Wire Burn-Outs

DO YOU have electric wire or cable that's exposed to high ambient temperatures? If so, there's now a way to avoid burn-outs and save real maintenance money.

A Gulf coast refinery was plagued with frequent failures of wiring on a hydrofomer. Temperatures up to 250 F caused conventional wire insulation to burn out in as little as three months. Refinery engineers then replaced some five miles of the old wire with silicone rubber covered wire. Result: excellent service.

Wire covered with Silastic, the Dow Corning silicone rubber, has eliminated so much downtime and saved so many man-hours that it is now specified for all new and replacement wiring in areas where it will be subjected to over 140 F.

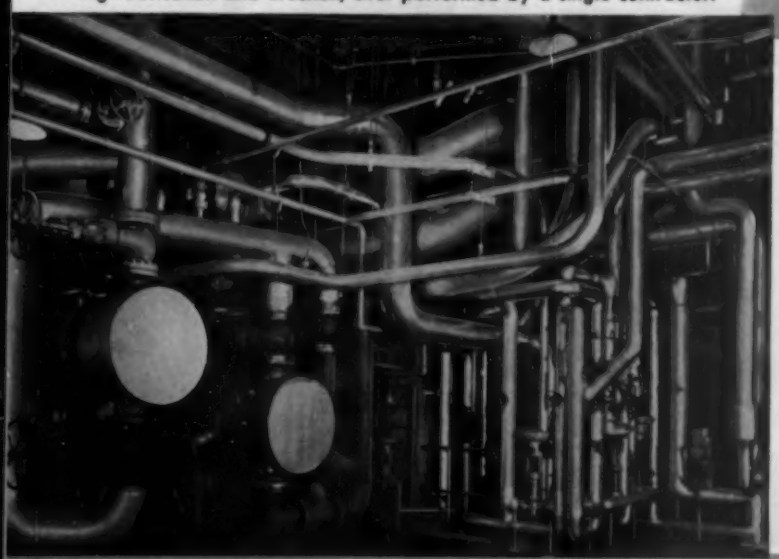
He's Looking For MONEY

This Midwest Piping Engineer is going over the customer's piping drawings in the light of his long experience in shop fabrication and field erection. He's looking for ways of doing a piping construction job better and at less cost.

Before a construction job is placed in the Midwest shops for fabrication, experienced engineers prepare Field Erection Sketches dividing each line into a series of subassemblies. These Sketches minimize and simplify the field welding . . . the difficult work is done in our well-equipped shops. They also disclose any discrepancies before fabrication instead of during erection. All erection planning has been done by our engineering staff . . . which reduces field thinking and eliminates guesswork. Erection is from these sketches instead of from the design engineers drawings . . . this speeds up the work and results in a real cost saving and earlier completion of the job.

The next time you have a piping job, you'll find it profitable to call in Midwest.

Midwest Piping at Kyger Creek plant which has a capacity of 1,075,000 kw and is the largest power plant piping contract (combining fabrication and erection) ever performed by a single contractor.



2746

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Main Office: St. Louis 3, Missouri (P.O. Box 433)
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MIDWEST ... PIPING FABRICATORS AND CONTRACTORS FOR MORE THAN 50 YEARS

Ford shifts

to coal for low-cost steam

Coal proves economical and easily available for steam generation at Ford's Louisville plant

Assembly Plant #2, Ford Division—Ford Motor Company, Louisville, Ky., was constructed in 1954. Because of the importance of steam for process work and heating, Ford's engineering department—working with the consulting firm of Albert Kahn Associated Architects and Engineers, of Detroit—conducted a fuel survey before the power house was designed. Object: to find an economical and efficient fuel.

Result: *coal* is used because of its *continuous* plentiful supply and advantageous price. Today this advanced coal-burning installation produces a reliable supply of low-cost steam. Only routine maintenance has been required and the cleanliness and general efficiency of this steam plant are considered among the outstanding features of its operation.

Facts you should know about coal

You'll find that bituminous coal is not only the lowest-cost fuel in most industrial areas, as in the case of Ford's Louisville plant, but up-to-date coal burning equipment can give you 15% to 50% more steam per dollar. Today's automatic equipment can pare labor costs and eliminate smoke problems. And vast coal reserves plus mechanized production methods mean a constantly plentiful supply of coal at stable prices.

Technical advisory service

To help you with industrial fuel problems, the Bituminous Coal Institute offers a free technical advisory service. We welcome the opportunity to work with you, your consulting engineers and architects. If you are concerned with steam costs, write to the address below. Or send for our case history booklet, complete with data sheets. You'll find it informative.

Consult an engineering firm

If you are remodeling or building new heating or power facilities, it will pay you to consult a qualified engineering firm. Such concerns—familiar with the latest in fuel costs and equipment—can effect great savings for you in efficiency and fuel economy over the years.

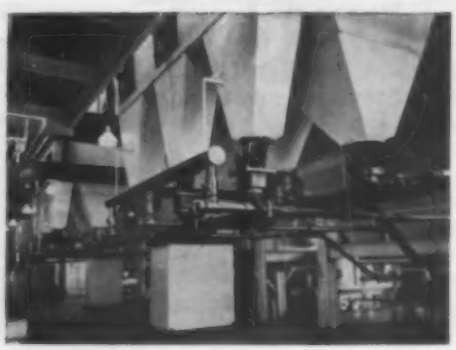
BITUMINOUS COAL INSTITUTE

Dept. 5P-06, Southern Building, Washington 5, D.C.

Firing aisle, shows Boiler #1 in right foreground. This is 60,000 lb/hr unit, using a two unit spreader stoker; Boilers #2 and #3 have capacity of 120,000 lb/hr and use four feeders. All three boilers are by Wickes Boiler Co., Type R, operating at 125 psi, 350 degrees F, fired by American Engineering "Perfect Spread" stokers.

Showing National Car Shaker being used to expedite emptying of cars. Dustless ash removal system in background.

Beaumont Birch Steam Vacuum System draws ashes through pipes to outside ash silo for removal. View is at basement level, below boiler room floor. Coal handling system also by Beaumont Birch Co.



Mechanical dust collectors are by Prat-Daniel Corp. Fly ash handling system removes ash from collectors and boiler passes.

Better training needed . . .

"Blast Injures Two; Damage Set at $100,000"

UNDER THE above headline we read the gruesome details of yet another tragic accident where unburned fuel has been detonated in the furnace of a plant boiler. Why did it happen?

The newspaper account says "cause not yet determined." Was it equipment failure? — possibly but not probably. Human failure? — unfortunately more nearly the truth.

The human failed because he did not know all of the facts that he needed. This leads to the conclusion that the instruction of operators deserves a lot more of our attention than we have been giving it. We must make up our minds that operator instruction must be more systematic, more thorough and wider in scope if we expect to operate today's complex plants safely, reliably and efficiently.

The idea that men can teach themselves (through observation of how others operate) to become competent power plant operators went out with the reciprocating engine and the vertical firetube boiler. Left to shift for himself, the average man might, in time, develop a limited proficiency in operation. He would learn what he could the hard way, but he would to a large extent operate by rote rather than by clearly understood principles.

Starting the Program

Who should do the instructing? Logically, this should be a function of the assistant station chief, results engineer or other individuals who qualify through having a thorough understanding of operation and an ability to communicate their knowledge to the trainees. Contractors' start - up crews and manufacturers' service engineers can be relied upon for valuable help.

The training program should be started three to five months before the commercial operating date. Classroom sessions devoted to explanation of the basic elements of plant equipment, flow diagrams and control systems should be supplemented by field trips to identify the physical equipment as it is being installed. The trainees must be encouraged to familiarize themselves with complete piping and control systems and be able to trace them out in their entirety.

Instruction Manuals

Instruction manuals prepared in advance are quite desirable because the trainees can study them in their spare time and absorb some of the knowledge which they may fail to get in the classroom. The instruction manual should:

1. Describe the equipment components.
2. Show their limitations and performance characteristics.
3. Demonstrate their relationship to other components.
4. Tell the operator:

a. How to put equipment in service and in what order.
b. How to take equipment out of service and in what order.
c. How to lubricate the equipment.
d. How to make running adjustments to equipment.
e. How to detect trouble and minimize damage to equipment.
f. What to do in case of breakdown of equipment.
g. What not to do so as to avoid overloading, overstressing or other abuse of the equipment.
h. What practices are safe and what are unsafe.

The instruction manual should, as far as possible, show the *why* of all steps in the standard procedures. If possible, it should even set forth some of the underlying reasons for certain of the design features to help the trainees to understand what they are expected to do and why.

Instruction manuals should be replete with diagrams, drawings, charts and performance curves. Charts and curves are easier to understand than tabulated data.

Small pocket notebooks have been used to advantage. These can contain abbreviated descriptions of operation and miniatures of simplified flow diagrams. They are carried by the operators to refresh their memories and eliminate the delays occasioned by frequent trips to the office to look up drawings and other pertinent data.

Plant Practice

It is also important to explain that some unorthodox methods of operating are used during preliminary operation which would not be considered desirable from the standpoint of reliability after the plant is in commercial operation. The differences and reasons, therefore, should be clearly stated.

The trainees should be taught to develop self-reliance. They should be inspired to use their imagination and to visualize what action should be taken in emergencies such as the failure of a boiler feed pump, loss of fuel and so forth.

There are many operators who seem hopelessly confused when confronted with the choice of maintaining the load or risking serious damage to the equipment by attempting to keep it in service after initial signs of distress have become evident. In several instances the failure of the operators to act promptly resulted in a six-week shutdown instead of a 3-4 hour shutdown.

During the training period the trainees must be given the opportunity of "learning by doing." The instructor should never perform an actual operating step, except in dire emergency, because to teach effectively he must see that the trainees do the operating *under his supervision*. Job rotation must be used to broaden the

(Continued on next page)

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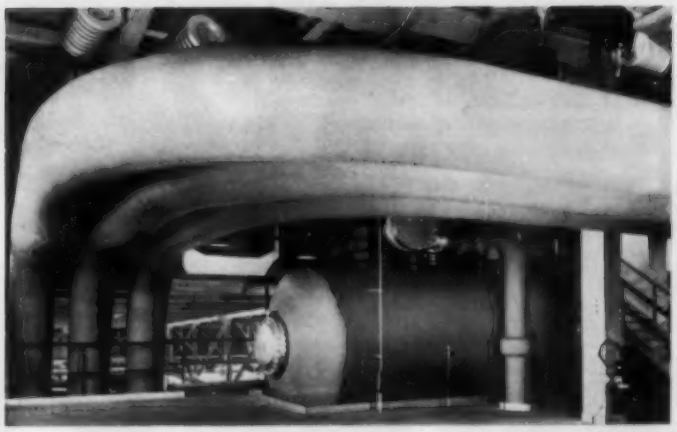
field of experience of the trainees.

At the conclusion of the formal training course both written and oral examinations should be given to find out what the trainees have gotten out of the course. The examination results will show whether additional instruction is needed and who needs it.

No matter how thorough the training of an operator is he may still make mistakes, but if we do our job of instructing as we should, his errors will not result from his ignorance of what to do or what not to do. It is also reasonable to expect that the hazards to life and property will thereby be materially reduced and that his satisfaction with the job will be enhanced.

By J. M. TOTTEN



Steam Pipe Insulation

THESE steam pipes at a Baltimore Gas and Electric plant are wrapped with U. S. Rubber's new asbestos insulation protective fabric. With lightweight and built-in stretch characteristics, it can be easily applied and offers a smooth, wrinkle-free surface.

Relay Eliminated

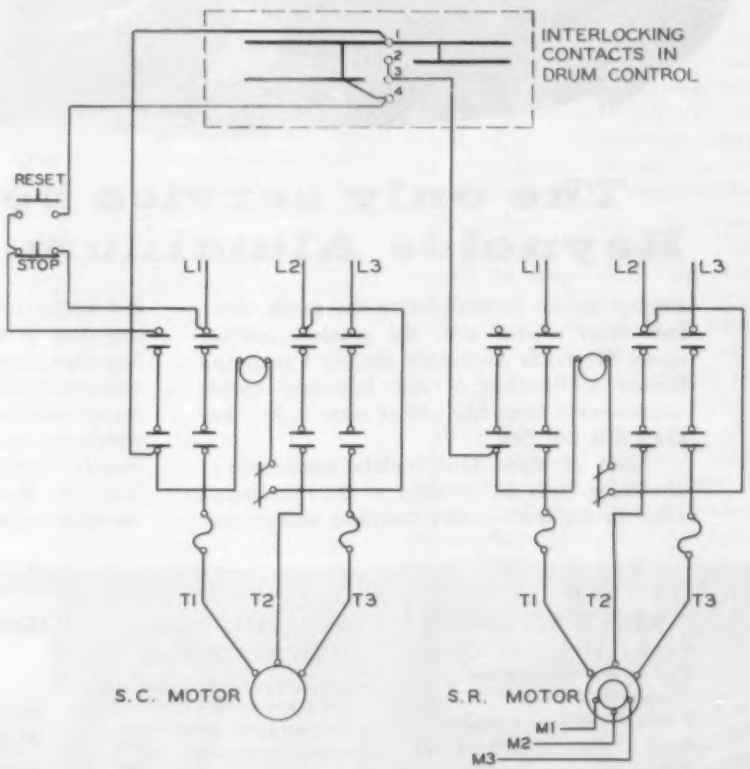
DRUM protection is normally obtained by the use of an auxiliary relay in the control circuit of the magnetic starter and interlocking contacts of the drum control.

This auxiliary relay can be eliminated if two or more starters are used on the same machine or job. As shown in the diagram, the starter for the squirrel cage motor is to be energized at the beginning of the job and remains energized for the duration. Instead of adding an auxiliary relay to get drum protection, the interlocking control contacts of this starter were used.

In operation, when the reset button is depressed, the control potential is applied to segment and finger No. 1 through segment and finger No. 4 of the drum interlocking contacts. The starter is energized at the same instant, and the control potential will remain at the drum interlock contacts until the starter is de-energized.

When the drum control handle is moved, bringing either segment No. 2 or No. 3 into contact with their respective finger, the starter for the slip ring motor will be energized.

If, while the machine is in operation and power is interrupted and then resumed, the drum must be brought to the "off" position before the first starter can be energized again. So, we have low voltage protection as well as drum protection; and, of course, with the proper overload heater coils in the starters, we have motor protection.



As this is already an interlocking circuit, it could be used on a number of jobs, such as a conveyor carrying material from a crusher — the crusher using a slip ring motor and the conveyor, a squirrel cage motor, and where the conveyor would be running before the crusher is started.

By ROY HOBBS, Oronogo, Mo.

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FUEL SATISFACTION

come from Modern Mines along the N&W

The *Fuel Satisfaction* coals mined along the Norfolk and Western are just naturally superior. Nature "refined" them in deeper, older seams, making them cleaner and purer . . . higher in heat values, lower in waste material.

Careful, scientific processing in modern coal preparation plants, plus dependable N&W transport service, makes *Fuel Satisfaction* even more beneficial to industrial coal users of every type.

Whether you use coal for heat, power or special purpose, there's a *Fuel Satisfaction* coal to meet your specific requirements for quality, economy and performance—consistently! Let us prove it to you. Let us give you additional *Fuel Satisfaction* facts.

There is no obligation for advice and assistance on utilization problems. An N&W coal specialist will be glad to call on you at anytime, at your convenience.

Contact these N&W Coal Bureaus

ROANOKE
N&W Coal Traffic Dept.
Telephone Diamond 4-1451
Ext. 313, 423, 249, 732
Roanoke, Virginia

BOSTON
833 Chamber of Commerce Building
Telephone Liberty 2-2229
Boston 10, Massachusetts

CHICAGO
Room 604,
208 South LaSalle Street
Telephone RAndolph 6-4624
Chicago 4, Illinois

CINCINNATI
913 Dixie Terminal Building
Telephone DUnbar 1-1325
Cincinnati 2, Ohio

CLEVELAND
Room 722,
The Illuminating Building
Telephone MAin 1-7960
Cleveland 13, Ohio

DETROIT
1907 Book Building
Telephone
WOodward 1-2340 or 1-2341
Detroit 26, Michigan

ST. LOUIS
2059 Railway Exchange Building
Telephone MAin 1-1180
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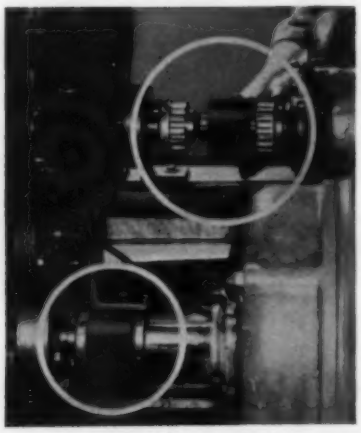
For more information, use Reply Card—Page 97

NEW Product Briefs



"Dry" Flexible Coupling

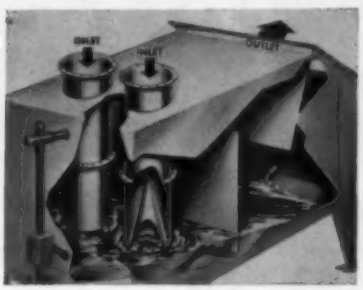
F-1 The new PowerGrip flexible coupling by **United States Rubber Co.**, 1230 Avenue of the Americas, New York 20, New York, is designed for troublesome power transmission conditions.

The positive dry coupling that never requires lubrication is made up of three component parts: a heat and oil-resistant neoprene sleeve with axially-molded internal teeth and two metal end-fittings with grooves that match the sleeve's teeth. Neoprene sleeves are reinforced with high-capacity textile fibers in larger-size couplings.

Simplicity of design offers several advantages. Initial cost and maintenance charges are low. Installation can be made "by eye" shaft-alignment without precise, micrometer measurements. Overall length of the coupling can be varied simply by increasing the length of the sleeve section as design requirements are modified or machinery is shifted. The sleeve's neoprene teeth are designed to move easily and positively in the grooves of the end-fittings, eliminating metal-to-metal contact and the need for lubrication.

In cases of severe overloads, the rubber sleeve expands, permitting the end-fittings to revolve. The coupling also has a 30 degree twist angle which gives it the ability to absorb load pulsations, shocks and torsional displacements and can eliminate the need for slip clutches or spring-type shear pins.

PowerGrip flexible couplings are manufactured in two basic hub sizes with two, four and six ply rubber variations to increase torque capacity for each hub size. These six units satisfy standard requirements for loads up to 40 horsepower at 1750 rpm or torque loads up to 1440 inch-pounds.



Complete Turbulaire-Doyle unit to handle 15,000 cfm will measure about 6 ft wide by 8 ft high by 10 ft long.

Wet Scrubber Units for Gas Cleaning & Cooling

F-2 The new Turbulaire-Doyle Scrubber, offered by **Western Precipitation Corp.**, 1000 West Ninth St., Los Angeles 54, California, combines high dust collection efficiency with low pressure drop, minimum maintenance and wide adaptability.

The new dust collection unit impinges dust-laden gas at high velocity into a pool of scrubbing liquid. The high velocity causes the particles to penetrate deeply into the liquid, accentuating the wetting action and producing high dust collection efficiency.

The Turbulaire-Doyle Scrubber is being offered to industry by Western Precipitation under license from the original developer. The Consolidated Mining and Smelting Company. Design is backed by some 70 installations in diverse fields.

Being recovered in the form of liquid concentrates and slurries are iron oxide, phosphate rock, lead sinter, coal and coke dust, as well as lead fume, arsenic fume, phosphate fume, ammonia and volatile fluorides. Considering the efficiencies obtained (97-99%) pressure drop of 5-10 in. of water is moderate and low liquid ratio of 1-5 gpm per 1000 cfm indicates that the scrubber can be used advantageously even in areas having low supply of water or other scrubbing liquid.

Unit consists of a sloping rectangular tank with impingement and eliminator sections separated by baffle plate across tank at right angles to gas flow. Impingement section contains overflow Weir for controlling fluid level and gas inlet nozzle incorporating cone increasing gas velocity.

PVC Bleeder Valve

F-3 An original design bleeder valve made of corrosion-resistant polyvinyl chloride has been developed by the **Walworth Company**, 750 Third Avenue, New York 17, New York.

The Walworth bleeder valve can be used for bleeding, sampling or drawing off small amounts of liquid from pipe lines, duct systems, tanks and similar applications. It has no packing and operates in the same way as a drain cock on an automobile radiator or steam boiler.

The valve is available in ¾-in. size with male IPS threads. It can be screwed into any female threaded ¾-in. fitting or fixture, or can be used with appropriate bushings for size adjustments.

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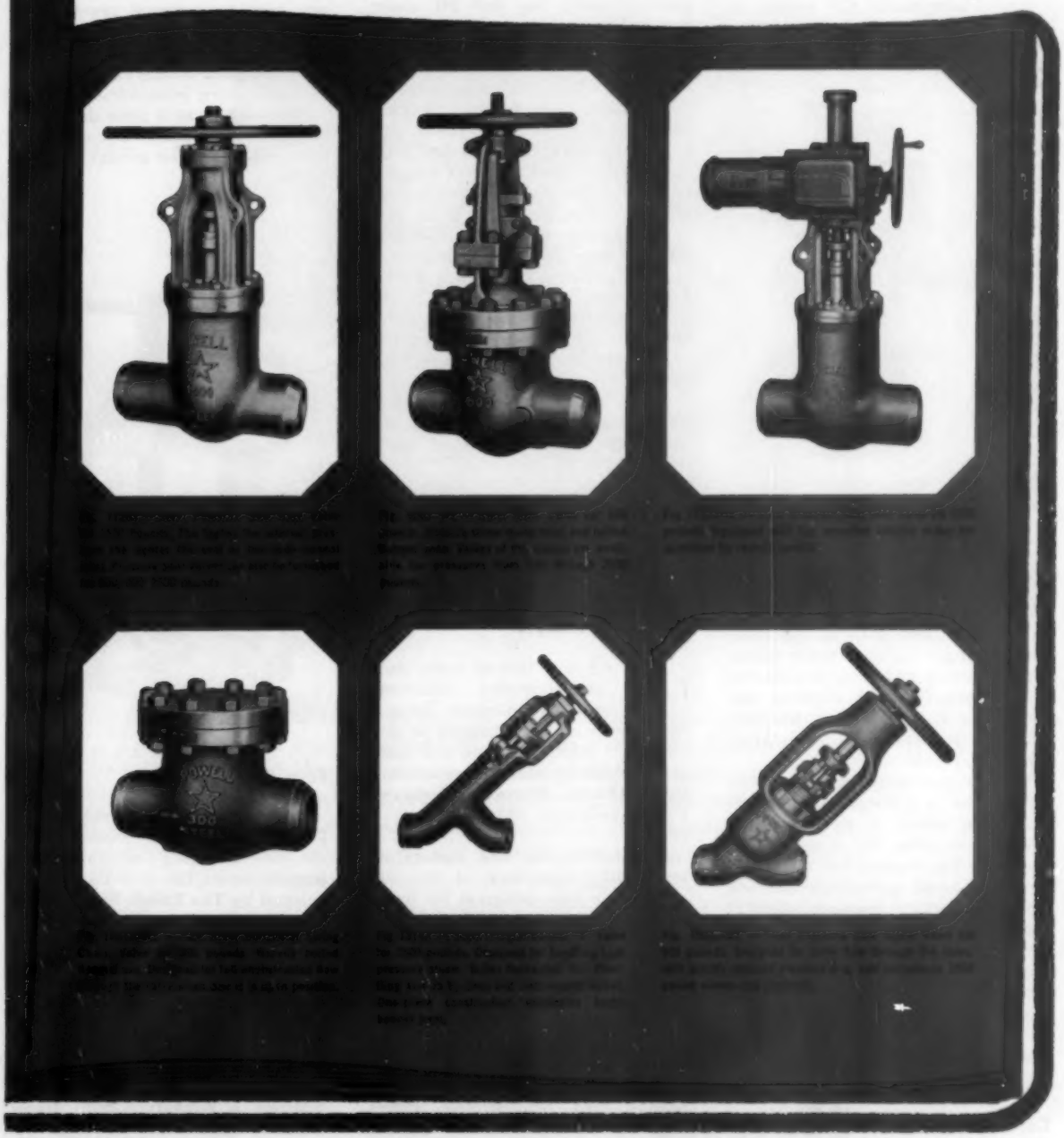
POWELL

world's largest family of valves*



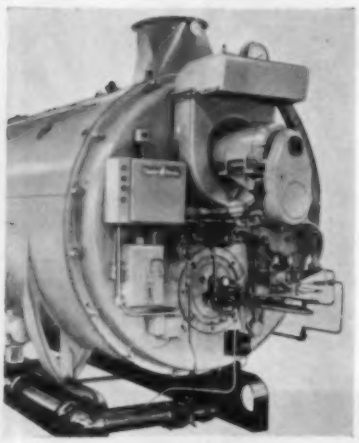
* and in this family there's a valve for every flow control requirement—for handling water, oil, gas, air, steam and corrosive fluids—available in the most required sizes and types. If your local distributor can't supply you, or if you need specially engineered valves for unusual conditions, write

THE WM. POWELL COMPANY • *Dependable Valves Since 1846* • **Cincinnati 22, Ohio**

New Product Briefs (Continued)

Packaged Boilers; 15 Sizes — 45 Models

F-4 Newest developments in packaged boilers are the new model CB boilers in 250 hp, 300 hp and 350 hp sizes. This expansion of the CB boiler line to 15 sizes, 45 models, is announced by **Cleaver-Brooks Company,** 305 E. Keefe Ave., Milwaukee, Wisconsin.



The new packaged boilers offer a number of new developments — an inspirating pilot which establishes pilot flame with no gas pressure; a single tip retractable nozzle that efficiently mixes air and oil and is removable for quick cleaning; and rotary air damper which provides smooth, positive air modulation without rumble or vibration.

The air atomizing burner on the CB boilers is a single tip, retractable type which is clean burning even when using No. 5 and No. 6 fuel oils. The burner has many advantages found previously only on steam atomizing burners used in central station plants. There are no high speed moving parts. The air atomizing burner has a deffuser and nozzle which are stationary. Through a single air solenoid valve, oil lines are purged after each burner operation.

Color Coded Chemical Packings

F-5 A new line of color coded mechanical packings for chemical processes has been introduced by the **A. W. Chesterton Co.,** 6 Ashland St., Everett 49, Mass. Their color coding provides positive service identification, prevents mix-ups and simplifies inventories.

Just three styles of Chesterton packing cover the full pH scale: For sealing strongest acids (pH 1 to 4), a blue packing is used, Chesterton Blu-Lon, in which each blue asbestos fibre is multicoated before (and after) braiding with a pure concentrate of DuPont Teflon.

For sealing mild acids and mild alkalies (pH 5 to 7), a black graphited Chesterton Style 315 braided asbestos packing is utilized.

For sealing strong caustics and other alkalies (pH 8 to 14) there is a white packing, Chesterton White-Lon, which has received a multicoat of Teflon over asbestos fibres before and after they are braided.

A fourth Chesterton Packing "Super-Lon" is brown color coded and can be used over the entire pH scale from sulphuric acid to sodium hydroxide. It is woven of 100% filament Teflon yarn.

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Capacitor Motors

F-6 A new line of heavy-duty capacitor-start induction-run single phase integral horsepower motors designed to provide high starting torque and operating efficiency has been announced by **Fairbanks, Morse & Company,** Fairbanks-Morse Bldg., Chicago 5, Ill.

For starting, the new motors use top-quality capacitors of the dry electrolytic type designed for maximum starting torque with minimum current usage. When the motor gains speed, a centrifugal switch cuts out the capacitors for straight induction run.

These F-M single-phase induction motors are especially suited to the severe conditions and high starting torque required for service with: pumps, fans, drill presses, lathes, sanders, circular saws, laundry washers, brine agitators, pulp grinders and similar equipment. These Type WCZK single-phase 60-cycle, 115/230 volt motors are available from ¾ hp to 1½ hp at 1200 rpm, 1 hp to 3 hp at 1800 rpm, and 1½ hp to 5 hp at 3600 rpm.

NEMA Rerate Motors

F-7 **Brook Motor Corporation,** 3553 West Peterson Avenue, Chicago 45, Illinois, has introduced a new line of a-c motors built to NEMA Rerate Specifications.

This new line takes advantage of technical improvements and modern, high temperature resisting insulations to provide a motor that is lighter in weight and smaller or more compact, occupying less space, and also more economical.

Presently rerated open drip proof motors are available but other rerated types will be available in the future.

Five Jaw Vise

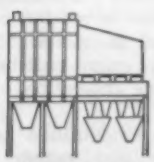
F-8 A new, low cost, quality ⅛" to 4½" capacity vise, featuring several design improvements, has recently been developed by **The Toledo Pipe Threading Machine Co.,** Toledo 4, Ohio. Probably the outstanding feature of the new Toledo No. 25 Vise is the addition of two jaws, making a total of five. According to the manufacturer, five jaws (instead of the conventional three) give an absolutely positive grip, regardless of pipe or conduit size, up to 4". The No. 25 features a powerfully-built frame, utilizing large Acme screw threads, which should result in longer service. Non-slip, integral pipe benders are designed to keep pipe from slipping, thus preventing accidents. Evenly distributed contact points insure mounting that is solid and that will stay put.

Mastering the double-eddy dust devil leads to extra dust collection efficiency!

DUST IN THIS PART OF THE DOUBLE EDDY WHIRLS UP IN ALL CYCLONES...
BUT BUELL'S EXCLUSIVE "SHAVE-OFF" TRAPS IT...
HARNESSES THE "DUST DEVIL" FOR EXTRA EFFICIENCY!

BUELL CYCLONES

"SF" ELECTRIC PRECIPITATORS



PRECIPITATOR-CYCLONE COMBINATIONS

Only Buell Cyclones have the "Shave-off" that removes the fines carried in the double-eddy currents, minimizes reentrainment, assures measurably higher dust collection efficiency! Other exclusive extra-efficiency features include *large-diameter* design that eliminates bridging and clogging, proper proportioning for maximum dust separation from the gas stream, extra-heavy-gauge, wear-resistant construction, Buell-designed manifolding that minimizes draft loss, minimizes scouring and eddying. For more information send for a copy of the booklet, "The Exclusive Buell Cyclone." Dept. 80-F, Buell Engineering Company, Inc., 123 William Street, New York 38, N. Y.

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Experts at delivering Extra Efficiency in **DUST COLLECTION SYSTEMS**

1. Subox is the only paint in America made with suboxide of lead. Because it continues to be chemically active after drying, it gives more anti-corrosive protection — clings better to the small surfaces of fence wire. A single coat lasts many years.

2. Subox makes fence painting easy and economical. It can be brushed or sprayed on, but it is applied especially fast with a roller or an ordinary floor broom.

3. The most popular shade of Subox (Subalox 508) closely resembles weathered galvanizing. It is an ideal spot paint for all galvanized surfaces. Subox also is available in a wide range of modern pastel and dark colors.

Write today for technical literature, color card and the booklet "Simplified Fence Painting."

SUBOX PAINTS

Subox Inc.

Established 1924
6 Fairmount Plant
Hackensack, N. J.

New Products (Cont'd)

Air-Operated Valves

F-9

A new line of air-operated valves has been developed and is now in production by the **High Pressure Equipment Co. Inc.**, 1222 Linden Street, Erie, Pa.

Design is for on-and-off service in line operation. With 6 to 30 lb of

instrument air the valve operation delivers up to 1500 lb force. Since at 30,000 psi the steam must pierce over 900 lb pressure to close, the air control aids in the ease and accuracy of the valve operation.

The valve line is manufactured to operate three ways: (1) air to open — spring to close (2) spring to open — air to close (3) air to open — air to close. It is available with manual over-ride safety emergency feature and can be specified for high temperatures.

Line is produced in 316 and 410 stainless steel body material, and the replaceable seats and stems feature is especially advantageous where a corrosion or erosion condition might exist. It is also offered with adjustable micro-switches to determine remote indication of the valve position.

The valves are identified as the "Remarco" line and include tube sizes of ⅛", ¼", ⅜", ½", 9/16" and standard pipe sizes in pressure ranges of 10, 30, and 60 psi.

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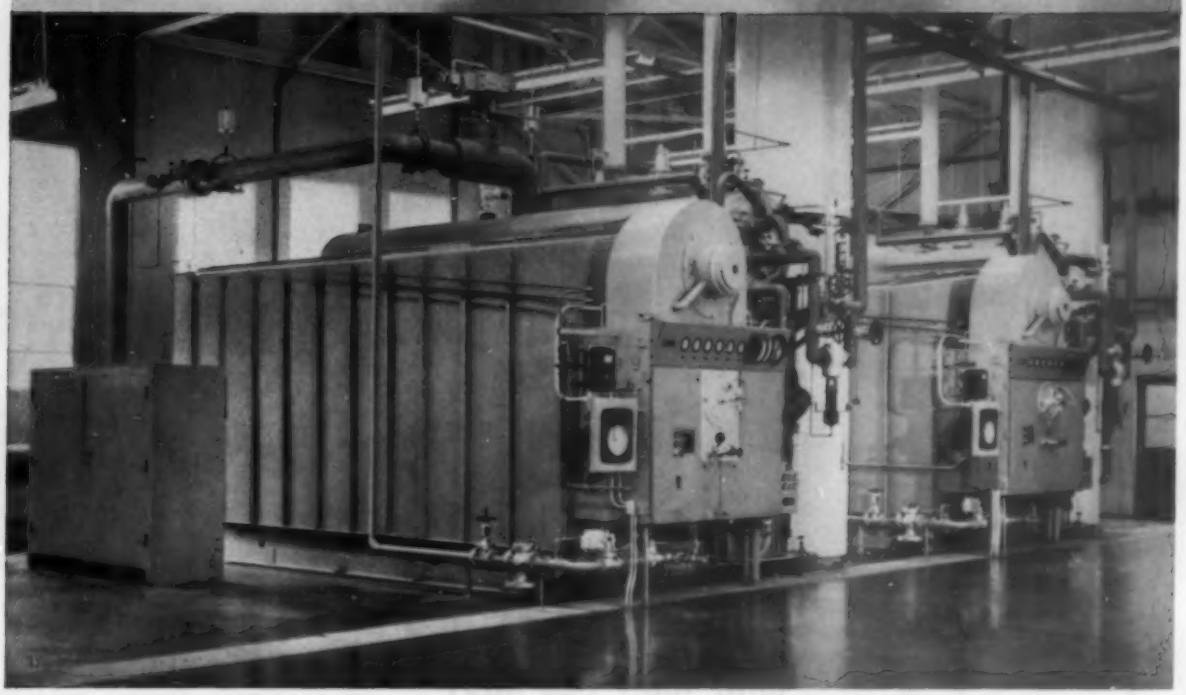
PACKAGED STEAM
by Foster Wheeler
at BOEING DEVELOPMENT CENTER



Two 34,000 lb/hr Packaged Steam Generators supply heating and process load at aircraft and missile research center

In the boiler room at Boeing Aircraft Company's new development center in Seattle, Washington, the two Foster Wheeler AG-134 Packaged Steam Generators shown above provide ample capacity for both present and future loads.

Each unit has a guaranteed rating of 34,000 lb/hr at 250 lb design pressure and 150 lb working pressure with oil firing. When firing natural gas, the output is 32,000 lb/hr.

Shipped completely assembled from Foster Wheeler's Dansville, N. Y. plant, they were installed on simple slab foundations. Each unit is equipped with semi-automatic combustion controls and a 44-inch self-supporting stack. The 36-inch steam drum includes a baffled steam collector, piping for feedwater distribution, continuous and surface blowoff. Staggered boiler bank tubes and closely spaced waterwall tubes contribute to high efficiency while large furnace volume provides conservative rates of heat liberation.

FW Packaged Steam Generators are now available in capacities from 10,000 to more than 60,000 pounds per hour. For complete information, write to *Foster Wheeler Corporation, 666 Fifth Avenue, New York 19, N. Y.*

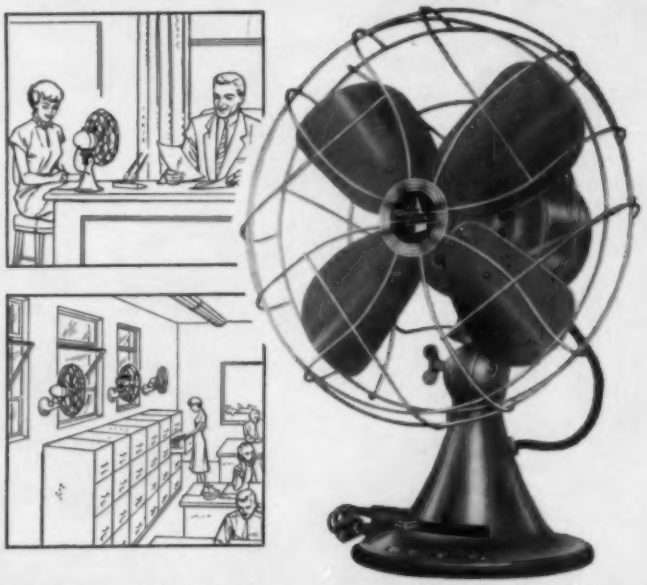
FOSTER WHEELER

NEW YORK • LONDON • PARIS • ST. CATHARINES, ONT.

Replace dead air with

Active air

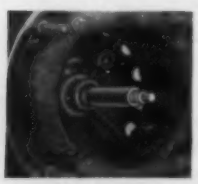
Good for everybody



Emerson-Electric—your best fan buy!

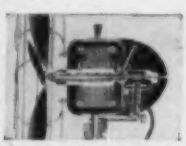
Dead, stagnant air—even in air-conditioned areas—is uncomfortable. ACTIVE AIR is refreshing, stimulating. That's why Emerson Electric ACTIVE AIR oscillators are so widely used for desk and wall mounting—by keeping air *in continuous* circulation, they add to everyone's energy and well-being.

Emerson-Electric fans are your best buy. Many have been in operation *for 25 to 40 years!* Today, Emerson-Electric ACTIVE AIR fans give you better service, more convenience. Five-year Factory-to-User Guarantee.



◀ Stationary hollow-steel shaft is case-hardened and rigidly anchored to the motor frame. Quieter, longer fan life.

Forced-feed lubrication—spiral oil grooves and conveyor return—continuously feed oil to bearing surfaces. Longer bearing life. ▶



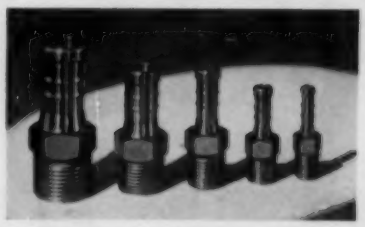
◀ Finger-tip oscillation adjustment—simply "dial" any sweep, from 90° to stationary. Exclusive, convenient.

See your distributor for more information or write for catalog No. F-214.

THE EMERSON ELECTRIC MFG. CO., ST. LOUIS 21, MISSOURI

Emerson-Electric of St. Louis • Since 1890

New Products (Cont'd)



Hose Nipples for Corrosive Problems

F-10 Hose nipples made of type 316 stainless steel are now available to industry in five sizes, ¼" x ¼", ⅜" x ⅜", ½" x ½", ¾" x ¾", and 1" x 1", from the **Band-It Company**, 4777 Dahlia Street, Denver 16, Colorado.

In addition to all the exceptional corrosion characteristics of type 316 stainless steel, the new hose nipple is designed to provide maximum flow, greater holding qualities in the hose and extend hose life by minimizing abrasive action of the nipple end. Hose nipples of this design are also offered in 19 sizes of carbon steel and 8 sizes in brass.

Industries who may have corrosion problems such as high temperature chemical processing, textile, pulp and paper, marine, rubber, food processing, petroleum, edible oils, plastics, brewing, distilling, water systems, sewage disposal, atomic energy, refrigeration, food dispensing and related industries, should find these type 316 stainless steel hose nipples a helpful solution to

For More Free Data CIRCLE CODE NO. on the Handy Return Card — Page 97

Feedwater Heater With Dual Level Control

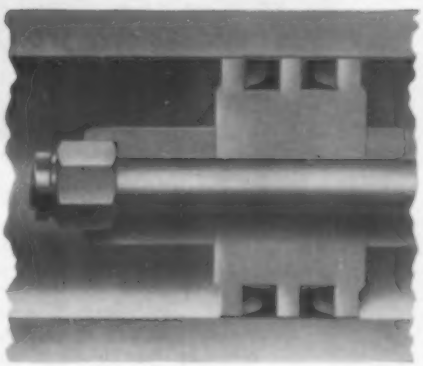
F-11 A new dual liquid level control with high and low water alarms for its line of feedwater heaters has been introduced by **Stickle Steam Specialties Co.**, 2215 Valley Ave., Indianapolis 18, Ind.

The control is recommended for installations where the primary supply for makeup water is subject to interruption. In the event feedwater in the storage section reaches a preset low, an alarm sounds and

NEW FLARED-LIP U-CUP PACKING REDUCES FRICTION

Garlock's new homogeneous U-cups are designed for minimum frictional resistance in low pressure air or hydraulic cylinder applications. They are molded of synthetic rubber with flared sidewalls which also facilitate assembly, especially when cylinder bores vary slightly in size. Instantaneous sealing after sudden pressure changes is another advantage of the flared-lip design. Sizes ½" O.D. to 3¾" O.D. are available from stock. Sizes to meet all AN6226 and JIC dimensional specifications.

Homogeneous U-cups are another part of the famous "Garlock 2,000" . . . two thousand different styles of packings, gaskets, and seals to meet all your needs. It's the only complete line . . . it's another reason you get unbiased recommendations from your Garlock representative. Call him or write for AD 163.



The new Garlock 9511 U-cup Packing is recommended for pressures to 2000 psi. The flared-lip design creates an interference fit especially adaptable to applications involving sudden pressure changes. Clearance at the heel reduces friction, makes assembly easier.

THE GARLOCK PACKING COMPANY, Palmyra, N.Y.

For Prompt Service, contact one of our 30 sales offices and warehouses throughout the U.S. and Canada.

GARLOCK

Packings, Gaskets, Oil Seals, Mechanical Seals, Plastic Products, Molded and Extruded Rubber

"OUT IN THE OPEN"

Vogt

Steam Generators

for

CHEMICAL PLANTS

and

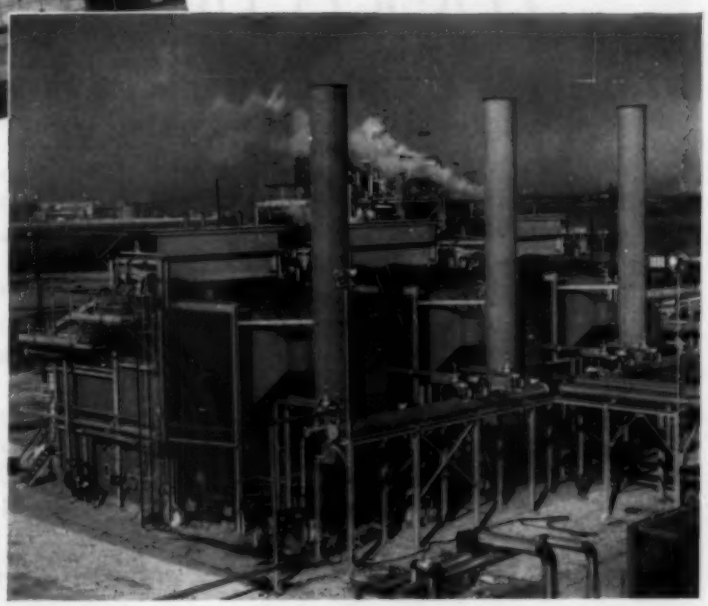
PETROLEUM REFINERIES

STEAM GENERATORS for economical outdoor operation have been featured by Vogt for many years and serve leading chemical plants and petroleum refineries. Requiring no building for housing, such installations, as pictured here, produce more steam per dollar of investment and are a definite aid to lower production costs.

Get Vogt's recommendations for steam generators to meet your needs for power, processing, or heating, without obligation. Package type and custom built units are available in a wide range of types, capacities, and pressures to meet operating requirements.

Write for bulletins. Dept. 24A-BS

Three 85,000 #/hr. steam generators in a Texas refinery.



An outstanding chemical plant served by three 150,000 #/hr. units.

OTHER VOGT PRODUCTS

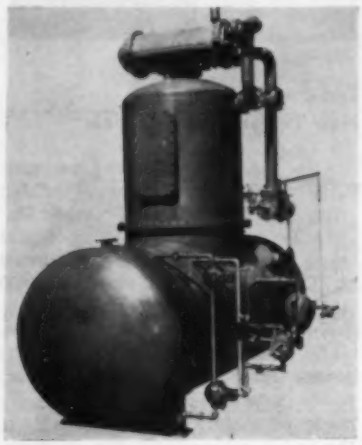
Drop Forged Steel Valves, Fittings and Flanges — Petroleum Refinery and Chemical Plant Equipment
Heat Exchangers
Ice Making and Refrigerating Equipment

HENRY VOGT MACHINE CO., LOUISVILLE, KY.

SALES OFFICES: New York, Philadelphia, Chicago, Cleveland, St. Louis, Dallas, Charleston, W. Va., Cincinnati

the control automatically switches on the secondary water supply.

A different sounding alarm is actuated whenever a preset high point is reached in the storage section, so that the trouble can be corrected promptly.



The control is available on all Stickle deaerating and non-deaerating feedwater heaters in the capacity range from 3,000 to 300,000 lb/hr, and with any desired storage capacity.

For More Free Data CIRCLE CODE NO. on the Handy Return Card — Page 97

Milling Attachment

F-12 **Alva Allen Industries,** 1001-15 No. 3rd St., Clinton, Mo., is manufacturer of a new milling attachment for mounting on lathes, milling machines, turret lathes, planers, boring mills, etc., for various types of work.

Spindle is mounted on Timken

NEW

ROPER

T-SERIES PUMP UNIT

Compact, Integral Construction

.6 to 6.8 GPM — Pressures to 400 PSI

for Hydraulic, Pressure Feed, or Transfer Work

Space-savers for those stationary or mobile units where dependable pumping is a must. That's the new T Series by Roper . . . the compact pump unit that is approximately the same size as a standard motor of HP required for driving. The pump serves as the end bell of the motor . . . design eliminates a coupling, thus conserving valuable space. Look into it now — it can well solve some of your pumping problems.

✓ **PUMP HOUSING** — High density cast alloy iron. Single piece back plate serves as end bell of motor.

✓ **PORTS** — ¾" NPT in faceplate for convenient connections.

✓ **GEARS** — Fatigue-proof steel spur gears run in axial hydraulic balance.

✓ **BEARING** — Heavy duty bronze assures accurate alignment of elements.

✓ **SEAL** — Lip type, with pressure relief system built-in to maintain zero pressure in seal chamber.

✓ **MOTORS** — Single phase, 60 cycle (standard) . . . open drip-proof or totally-enclosed. ¾ to 1 HP — single or dual voltage depending on size or need.

Send for Bulletin 31 Today

Roper Hydraulics, Inc.

436 BLACKHAWK PARK AVE.

ROCKFORD, ILLINOIS

ROPER

ROTARY PUMPS

Taper Roller Bearings and has No. 3 Morse Taper for tool. There are six different speeds, ranging from 200 to 900 rpm. The bottom of base to center line of spindle is 2" and capacity is 1" end mill. Total weight, including motor, is 63 lb. Priced at $245.00, including ½ hp motor, pulleys, V-belt and draw bar. Ready to operate for precision work on small or large parts.

Aluminum Jacketing Elbow

F-13 A new type of aluminum jacketing elbow that enables a limited number of units to cover most sizes of insulated piping, is being distributed nationally by the **Pittsburgh Corning Corporation**, One Gateway Center, Pittsburgh 22, Pa.

The fitting, called the Gasco Humped Aluminum Elbow, has an oversize radius or "hump" that allows its use over several pipe and insulation sizes and allows it to fit long and short radius "ells."

Twelve interchangeable sizes of "humped" ells fit over 107 combinations of varying pipe sizes and insulation thicknesses.

The covers are supplied in two halves which nest together and take up very little storage space. They are installed with sheet metal screws and may be removed for inspection or salvaged.

713-7

Safe Operation Of

OVERHEAD VALVES

with a

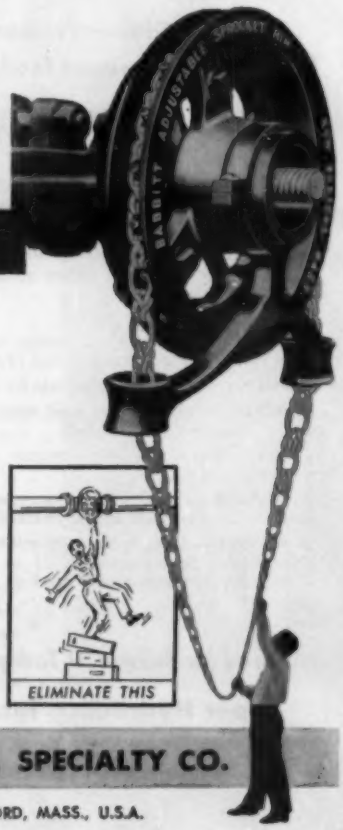
Babbitt

Adjustable

SPROCKET RIM

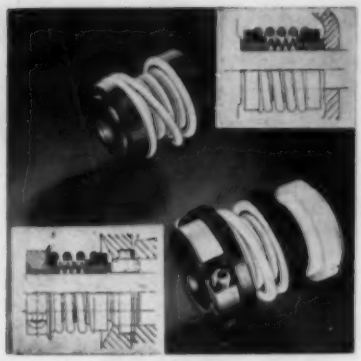
with Chain Guide

- Simplifies pipe layout
- Fits any size valve wheel
- Easy to install and operate
- Operates any valve from plant floor
- Time and money saving fixture
- No maintenance; first cost only cost
- Packed, completely assembled, one to a carton
- Hot galvanized, rust-proof chain available for all sizes
- Easy to follow instructions with each unit
- Your supplier carries complete stocks
- Write for new descriptive catalog sheet and prices



Babbitt STEAM SPECIALTY CO.

3 BABBITT SQUARE, NEW BEDFORD, MASS., U.S.A.



End-Face Shaft Seal Has Teflon Construction

F-14 A new bellows-type end-face shaft seal, in which only chemically inert DuPont Teflon is exposed to the liquid being sealed, has been announced by **Crane Packing Company**, 6400 Oakton St., Morton Grove, Illinois.

Known as the Type 20, it is especially designed for use where: (1) potent chemicals increase the corrosion rate of seal parts normally made of metal, such as springs, to the point where seal life is materially shortened; and (2) chemicals prone to crystallization will sometimes inhibit the flexibility of a shaft seal.

The main sealing member of the new shaft seal is a bellows of pure Teflon integrally molded with a sealing face of filled Teflon. The sealing face material and the opposed mating material can be varied to suit specific liquids, temperatures and pressures. No metal is exposed to the liquid, even when the seal is internally mounted.

Sizes for both types run from ¾" to 2", with design provisions to compensate for dimensional discrepancies encountered in chemical and similar type pumps.

For More Free Data CIRCLE CODE NO. on the Handy Return Card — Page 97

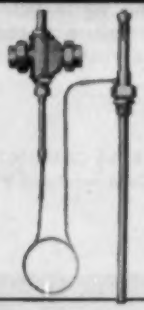
Tripod Winch

F-15 **The Lug-All Company**, 355 Lancaster Ave., Haverford, Pa., has introduced a complete new line of combination Tripod-Winches in capacities from ¾ to 7½ tons and lifting distances from the ground of 7'2" to 23'9" and cable lengths of 26 to 195 ft.

Loads can be raised and lowered with safety with the crank in either

Low-cost Temperature Control — by SARCO

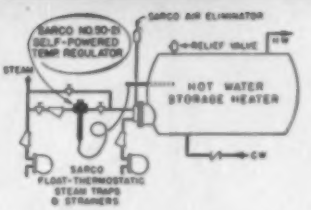
Self-Powered and Electric Indicating



Sarco Temperature Controllers
Self-Powered . . . Fully Modulating

Simple as ABC . . . a thermostat with capillary tubing and a valve. That's all! Operated by liquid expansion. Automatic. Self-powered . . . no electricity or compressed air required. Self-contained . . . no exposed mechanism. Packless valve . . . no stuffing box to leak or stick. Easy to install by any pipefitter.

Furnished with thermostats suitable for any liquid or for air in dryers, ovens, air ducts, etc. Valve sizes . . . ½ to 6". Temperature ranges to 300°F. *Bulletin 620-2.*

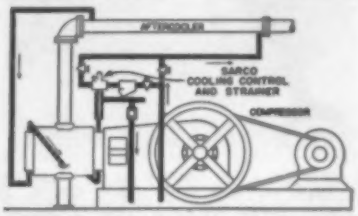


Typical applications: Shell and tube heat exchangers; condensers, oil storage tanks, dryers, etc.

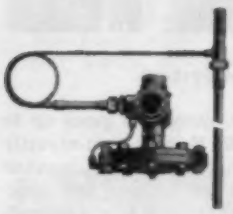
Sarco Cooling Controls
Self-Powered . . . Fully Modulating

Simple, compact, automatic thermostatic valve. Eliminates overcooling and undercooling. Saves water. Overall height of ¾" size is only 17⁷⁄₁₆". Self-powered . . . requires no electrical or compressed air hook-up. Valve and bulb all in one unit. No exposed mechanism. Single-seated packless valve . . . not affected by silt or scale-forming minerals.

Valve sizes . . . ⅜ to 1½". Temperature ranges between 40° and 210°F. *Bulletin No. 710-B.*



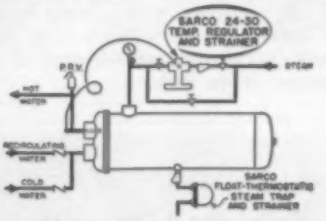
Typical applications: compressors, small engines, water-cooled bearings, condensers, dry cleaning stills, etc.



Sarco Temperature Controllers
Self-Powered . . . Single-Seated, Tight-Closing

A simple, self-powered automatic temperature controller with diaphragm-operated, pilot-controlled valve. Designed for intermittent service or service involving long periods with practically no call for steam. Self-powered by liquid expansion . . . no electricity or compressed air needed. Packless.

Valve sizes . . . ½ to 3". Temperature ranges to 300°F. *Bulletin No. 625-B.*

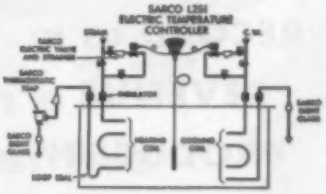


Typical applications: instantaneous heaters, fuel oil pre-heaters, high pressure applications on hot water storage tanks.

Sarco Electric Temperature Controllers
Indicating Type

Simple, inexpensive, electric-indicating automatic temperature controller. Sensitive enough to perform many of the functions of much more elaborate recorder-controllers, at a fraction of their cost. Responds to changes of ± ½°F. Adjustable. Large, easy-to-read scale shows both actual and set temperatures.

Temperature ranges between minus 90° and plus 650°F. Offers many sequence combinations such as step-heating. *Bulletin 1025-B.*



Typical applications: plating tanks, processing vats, kettles, chemical tanks, etc.

Sarcostat Hydraulic Motor Valves
Electrically Operated

For remote control by hand or thermostat. Open and shut operation. Can be equipped with semi-modulating mechanism. Powerful hydraulic action operates valves up to 5" single-seated, or 8" double-seated, at pressures up to 175 psi. Ruggedly constructed . . . to withstand severe use without constant supervision and with minimum maintenance. Operates in any position.

For direct connection to 110 volts A. C., 60 cycle current. Valve sizes . . . ½ to 5" single-seated; ½ to 6" double-seated. *Bulletin 1080-A.*

UNDIVIDED RESPONSIBILITY

From one "Complete Line" source . . . SARCO-SARCOTHERM . . . for temperature controllers, steam traps and other heating specialties.

2230-B

Write for Bulletins to — Sarco Co., Inc., 635 Madison Ave., New York 22, N. Y.

New Product Briefs (Continued)

a high or low gear ratio drive. A direct drive, to save time in operation, is provided for quick take up or let out of the cable when not under load. Lug-All tripod-winches are also equipped with a brake lever for lowering loads without using the crank, permitting adjustments of a fraction of an inch.

The movable legs allow adjustment of height and rigging on uneven terrain, also permitting compact storage and easy handling. Legs are equipped with shields to prevent sinking in soft ground. The side mounting of the winch reduces lost headroom and the cable pulls through an overhead pulley wheel.

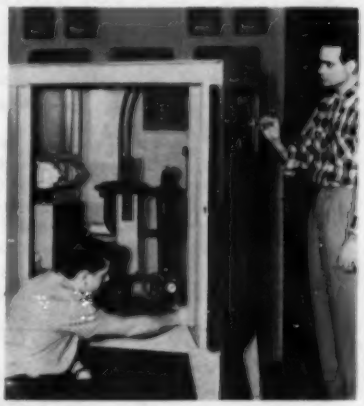
Chemical Feed Packaged Unit

F-16 The **Bird - Archer Company**, 4337 No. American St., Philadelphia 40, has announced an improved chemical feed packaged unit, designed to handle corrosive chemicals at a considerable saving in cost over stainless steel.

Principal features are a newly perfected 50 gallon polyethylene tank with polyvinyl chloride fittings. The unit can be fitted with a stainless steel headed proportioning pump and pvc piping to suction the pump. Agitator is furnished with stainless steel shaft and propellor.

It is priced the same as a regular steel tank for non-corrosive service. It is lighter in weight, easier to transport and set up. No gauge glass is needed because the white polyethylene tank is translucent and liquid level is always visible.

For More Free Data CIRCLE CODE NO. on the Handy Return Card — Page 97



Gas Analysis System

F-17 Hot, dirty exit gases up to 3200 F are continuously sampled, cooled, washed and analyzed for oxygen and combustibles content by a new gas analysis system available from **Bailey Meter Company**, 1028 Ivanhoe Road, Cleveland 10, Ohio.

System analyzes the exit gases from all types of combustion equipment including cement kilns, glass tanks, atmosphere generators, open hearths, and boiler furnaces.

Completely enclosed in a single compact cabinet, the analysis system contains: a gas pump, washer, separator trap, electrical switch, gear, and the gas analyzer. Transfer valves also included if multiple point sampling is required. May be installed outdoors as well as indoors. Product Specification E65-6 available on request.

Packaged Boilers; 11 Sizes — 20 to 200 bhp

F-18 **Superior Combustion Industries Inc.**, Times Bldg., New York 36, N. Y. has announced the addition of a new series to its line of fully packaged

. . . a machine with "A GOOD RECORD as a REVENUE PRODUCER"

A typical case of using a Niagara Aero Heat Exchanger to provide cooling for production equipment shows amortization of this machine in 16 months and $90 per day revenue thereafter.

Industrial engineers with careful cost, upkeep and revenue records on all machines, credit Niagara Aero Heat Exchangers with important gains over other methods.

They use these machines to provide cooling for production equipment, welders, extruders, drawing dies, furnaces, quench baths, plating, chemical and electronic process...all millwater system uses.

They get positive control of critical process temperatures with improved product quality, rejection losses prevented. Heat is removed at the rate of in-put.

A closed system, dirt free prevents all troubles from bad water; transferring heat to the atmosphere by the evaporation of a very small amount of water solves all problems of water supply or disposal.

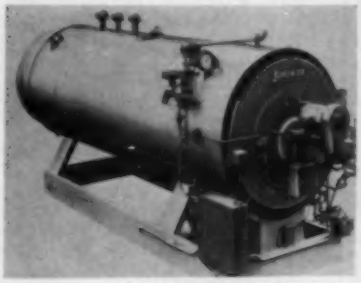
Write for Bulletins 120, 135

NIAGARA BLOWER COMPANY

Dept. SP-6, 405 Lexington Ave., New York 17, N.Y.

Niagara District Engineers in Principal Cities of U. S. and Canada

boilers, the Superior Compact. Although dimensionally small, all sizes in the Compact series have a full 5 sq ft of heating surface per boiler horsepower, and are designed around the time-tested 4-pass tube arrangement.



Built in 11 sizes, from 20 to 200 bhp, the Superior Compact is a complete package with burner, controls, refractory, insulation and draft equipment installed and wired at the factory. Each is fully factory-fire-tested before shipment. Following connections to fuel, water, steam and electric lines, and with only a simple vent for combustion gases, the unit can be in operation within 24 hours of delivery.

The basic boiler is of the horizontal, 4-pass, down-draft type.

Portable Pump

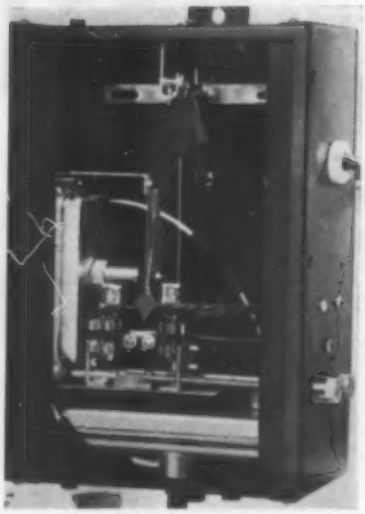
F-19 A new, portable, self-priming pump, the "Torrent," has been announced by **Hale Fire Pump Company**, Conshohocken, Pennsylvania.

The high volume capacity (up to 7,000 gph), and dependable self-priming make the "Torrent" ideal for use in pumping out cellars, ditches, flooded areas, and seepage control. The large-passage open impeller is said to provide "clogless" operation. Little or no maintenance is required even when pumping muddy or sandy water. The "Torrent" is also useful for filling water tanks.

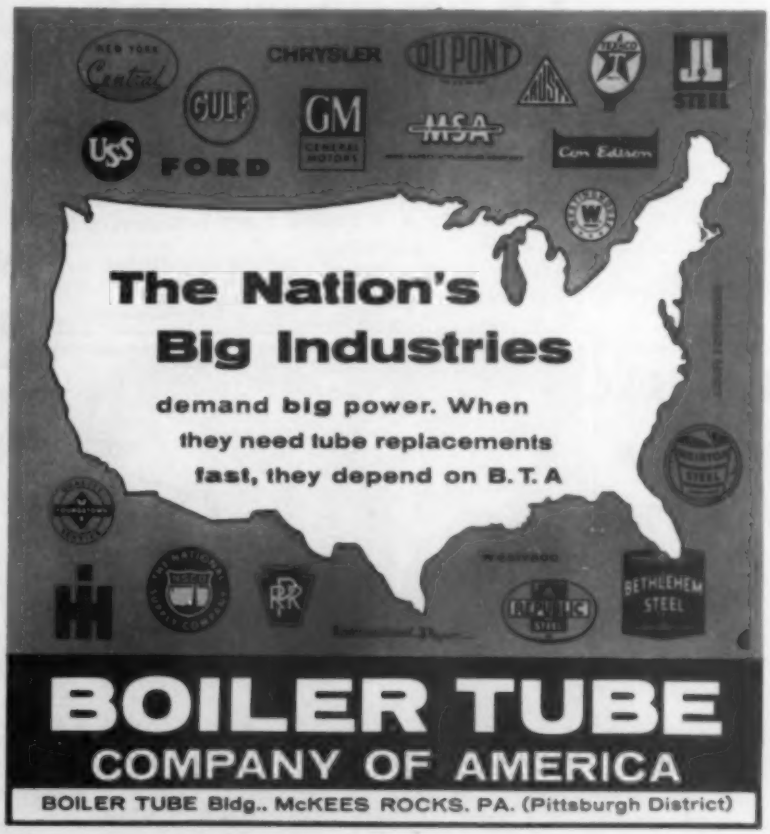
Unit is lightweight (only 54 lb), making it extremely easy to carry and easy to set up and use in hard-to-reach areas. Unit is powered by a 2¾ hp, 4-cycle engine with built-in exhaust valve rotator.

Pointer Draft Gages With Integral Alarm

F-20 **Ellison Draft Gage Co.**, 544 West Monroe St., Chicago 6, Illinois, has introduced a new line of gages for indicating and controlling pressure of gas or air. They combine an Indicating Draft Gage with magnetic type mercury switch for operating an alarm or signal light.



These gages are used to sound an alarm or light when abnormal resistance to air filters, dust collecting systems, etc., is present; as an alarm system to call attention to improper high or low pressure in ducts, across air filters and similar applications; or, for remote control of dampers and for starting blowers through relays.



NATION ENDORSES

Pittsburgh Firm Announces New Metal Discovery

PITTSBURGH (AP) — A. M. Byers to put on the market today a new kind of wrought iron described as the most significant development in the history of the metal.

This description was given at a news conference yesterday by B. M. Byers, president of the Pittsburgh firm. It is the world's largest maker of wrought iron products.

The improved product, known as 4-D wrought iron, is at least 25 per cent [illegible] to corrosion

Firm Producing Corrosion-Proof Wrought Iron

A new 4-D wrought iron has been announced by the A. M. Byers Co., Pittsburgh, according to E. G. Sullivan, field service engineer here for the firm.

Byers, largest producer of wrought iron, claims the new iron has greatly superior resistance against many kinds of corrosive forces, including

New Wrought Iron Produced

A new "4-D wrought iron" with 25 per cent increased corrosion resistance has been brought out of the laboratory and into production by the A. M. Byers Co., William E. Weber of Seattle, Byers field service engineer, said Sunday.

Weber said 4-D wrought iron is immediately available

4-D PIPE — R. R. Kirkwood (left), Chief Mechanical Engineer for John Graham & Company, Seattle, checks piece of 4-D Wrought Iron Pipe now being produced by A. M. Byers Co. Looking on is Byers' Seattle Field Service Engineer, W. E. Weber.

A. M. Byers Claims Improved Wrought Iron Less Likely to Corrode

By a WALL STREET JOURNAL Staff Reporter

PITTSBURGH—A. M. Byers Co., a producer of wrought iron products, announced its metallurgists have come up with a new and improved version of standard wrought iron.

Called 4-D wrought iron, simply a marketing term used to distinguish it from the standard product, it is expected to "aid substantially" in reducing losses stemming from material failures caused by corrosion, B. M. Myers, president, stated.

He said that standard wrought iron is already "a bulwark in the fight against corrosion." Wrought iron pipe, for instance, is used in water, waste and drainage lines, locomotive and diesel engine piping and underground airplane fueling lines, while flat rolled products go into coal chutes, bridge decking, pier protection plates, structural members and process materials tanks.

A. S. Chalfant, vice president-sales, said the new product will go on the market immediately. He added that the new product will sell for the same prices as those for standard wrought iron.

A. M. Byers Announces Results Of Tests On New 4-D Wrought Iron

PITTSBURGH, Mar. 18. — Results of three tests new 4-D wrought iron have been announced by the etallurgical department of A. M. Byers Company, ttsburgh. The test data documents the announcement made by A. S. Chalfant, vice president of sales, a press conference in ttsburgh in February at new 4-D wrought iron at least 25% more cor-

gion is characterized by agitation and plentiful oxygen."

Test Conditions

Byers Improves Its Wrought Iron

Special to World-Telegram and Sun.

PITTSBURGH, Feb. 13.—A. M. Byers Co., producers of wrought iron products, announced its metallurgists have found a new and improved version of standard wrought iron.

Called 4-D wrought iron, as a marketing term used to distinguish it from the standard product, it is expected to "aid

Develop New Wrought Iron

PITTSBURGH, Feb. 13 . M. Byers Co., a produc rought iron products, ounced today its metallur ave come up with a new nproved version of stan rought iron.

Called 4-D wrought mply a marketing term distinguish it from tandard product, it is exp "aid substantially" in re losses stemming from

A. M. Byers Co Develops New Wrought Iron

Dow-Jones Service

PITTSBURGH, PA., Feb. 13 A. M. Byers Company; produ of wrought iron products, nounced its metallurgists ha come up with a new and proved version of stand wrought iron.

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A. S. Chalfant, vice presid sales, said the new product go on the market immediat He added that the new prod

Civil Engineer C. E. Drummond (left), examines 4-D Wrought Iron sponge ball with J. A. Cain, A. M. Byers Company southeastern division manager. Laboratory test results have shown the new metal to be much

Developed By Byers

New Wrought Iron 25 Per Cent More Corrosion Resistant

250,000 Non-Rusting Fibers Per Square Inch In Product

By W. L. RUSSELL, Press Business Editor

Out of the laboratory and into production at Byers Co. has come a new type of wrought iron is credited with increasing corrosion resistanc much as 25 per cent.

The new 4-D is a result of 17 years of researc

In addition to superior resistance to corrosio new iron has greater uniformity and improved physic mechanical properties.

This is attained by substantially increasing the of the base metal, stepping up i

4-D WROUGHT IRON

M. Byers Co. Markets ew Kind of Wrought Iron

SBURGH (AP)—A. M. Byers wrought iron, developed after 17 t on the market today a years of research, has greater ind of wrought iron de- uniformity and better physical as the most significant and mechanical properties. ment in the history of the

The key to manufacture of 4-D wrought iron is removal of more oxygen from the base metal—

description was given at a nference yesterday by B.

Rykoskey, General Superintendent of Motive r, Baltimore & Ohio Railroad, gets a first hand from R. G. Angell (left), A. M. Byers Co. Railroad Manager, on the increased corrosion resistance w 4-D Wrought Iron. Byers recently announced a improvement in wrought iron which makes the ct at least 25% more corrosion resistant than ard wrought iron. Railroads are among the world's st users of corrosion resistant wrought iron.

A. M. BYERS DEVELOP NEW WROUGHT IRO

PITTSBURGH, Feb. 13—(DJ A. M. Byers, Co., a producer o wrought iron products, announced its metallurgists have come up with a new and improved version of standard wrought iron.

Called 4-D wrought iron, simply a marketing term used to distinguish it from the standard product, it is expected to "aid substantially" in reducing losses stemming from material failures caused

Corrosion Resistance Raised in Wrought Iron

PITTSBURGH, Feb. 15 (AP) The A. M. Byers Company has announced development of an improved type of wrought iron highly resistant to corrosion.

Known as 4-D wroug the product is the re seventeen years of r the company said.

B. M. Byers, preside the new wrought iron d by removin from the base refined iron— purer state

'New' Wrought Iron Developed

Production by A. M. Bye Company, Pittsburgh, P of a new "4-D wrought iron with 25 per cent increase

A. M. BYERS DEVELOPS NEW WROUGHT IRON

A. M. Byers Co., a producer of wrought iron products, announced its metallurgists have come up with a new and improved ver of standard wrought iron. Called 4-D wrought iron, simply keting term

4-D Wrought Iron Cuts Corrosion

Out of the labo

Here is news. It's about one of the most significant metallurgical advances of modern times: the increased corrosion resistance of new 4-D Wrought Iron. This improved metal provides longer service life at lower cost per year. You can get further details from the Byers representative or by writing direct: A. M. Byers Company, Clark Building, Pittsburgh 22, Penna.

M. Byers Making New Wrought Iron

most significant development e history of wrought iron urgy — new 4-D wrought — has just been announced M. Byers Company.

press conference Tuesday in rgh. B. M. Byers, president firm which is the world's producer of wrought iron te, told newsmen:

condensation.

According to E. P. Best, Byers chief metallurgist, the improved 4-D wrought iron was achieved by substantially increasing the deoxidation of the base metal; increasing the phosphorous content in relation to the other material components; and using fiberous material.

rought Iron More Resistant

wrought iron whose corrosion re- nce is increased 25% over standard ught iron is available. Marketed er the name 4-D Wrought Iron, product is the result of 17 years research, laboratory and in-service

he improved wrought iron is made

uniform di fiber throug

Also beca the metal i standard w mechanical

4-D wrou ing product

Placed

A. S. Chalfan sales, stated tha is simply a me to distinguish th from standard w be placed on t ately and would the Byers Comp

ROUGHT IRON IMPROVEMENT IS REPORTED

Out of the laboratory and into production has come "new 4-D Wrought Iron" with 25% increased corrosion resistance, A. D. Sheere, A. M. Byers Co. Pacific Coast manager, announces.

Mr. Sheere, of San Franc recently returned from Pittsb where he was given a previe the new material. He says Wrought Iron is immediately able—at no increase in price will save millions of dollar corrosion losses annually in Pacific Coast territory.

According to Mr. Sheere, 4-D Wrought Iron was achiev increasing the purity of the increasing its phosphorous co and using a more siliceous

New Wrought Iron Is 25 Per Cent More Corrosion Resistant

A new type of wrought iron, developed in the laboratories of A. M. Byers Co., Pittsburgh, is now in production. It is credited with increasing corrosion resistance as much as 25 per cent. The new metal, known as "4-D" is the result of 17 years

Byers Develops New Wrought Iron

PITTSBURGH, Feb. 13. — A. Byers Co., a producer of wrou iron products, states its me urgists have come up with a and improved version of stand wrought iron.

Called 4-D wrought iron, sim a marketing term used to dis guish it from the standard p uct, it is expected to "aid subs tially" in reducing losses stem

Byers Improves Wrought Iron

Special to the Herald Tribune

PITTSBURGH, Feb. 12.—A. M. Byers Co. announced today that it had developed a new kind of wrought iron, shown by tests to offer "greatly superior resistance" to corrosion.

Called "4-D," the improved wrought iron was achieved by substantially increasing the deoxidation of the base metal; increasing the phosphorous con-

Catawissa
PERFECT SEAL
Unions

HOT FORGED from solid, rectangular steel bars, designed and produced for dependable, long-life service under the severest piping conditions!

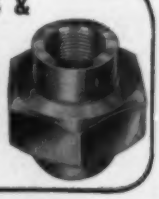
A TYPE FOR EVERY USE!
FOR ALL PRESSURES!
FOR ALL TEMPERATURES!

Standard & Double Extra Heavy
UNIONS
Available with screwed or socket weld ends. 3000-lb. sizes ⅛" to 3"; 6000-lb. sizes ⅛" to 2".

ORIFICE UNIONS
With screwed or socket weld ends. 3000-lb. and 6000-lb. service.

MALE & FEMALE UNIONS
With steel-to-steel, bronze-to-steel, stainless steel-to-steel or orifice seats. 3000-lb. service only.

FULL STAINLESS & FULL ALLOY STEEL UNIONS
With screwed or socket weld ends. 3000-lb. and 8000-lb. service.



WRITE FOR CATALOG 58
showing the complete Catawissa line of Perfect Seal Products

CATAWISSA VALVE AND FITTINGS COMPANY
950 Mill St. • CATAWISSA, PA.

Southern News Briefs (Continued)

R. B. Dowdy and James A. Dowdy

J. J. Finnigan — Ala.

R. B. Dowdy and **James A. Dowdy**, of Birmingham, Alabama have been appointed **Alabama** representatives of the **J. J. Finnigan Company, Inc.**, Atlanta, Georgia.

R. B. Dowdy is Chairman of the Board of Directors, Haydn Myer Company. He is a native of Florence, Alabama and a graduate of Alabama Polytechnic Institute with a degree in Mechanical Engineering. He was a Consulting Engineer before joining the Haydn Myer Company in 1935 as Southern Representative. In 1951 he was made President and Treasurer of the company, and subsequently gained his present position.

James A. Dowdy was born in Florence, Alabama. He was graduated from Alabama Polytechnic Institute, Auburn, Alabama in 1943 in Mechanical Engineering and is a licensed Consulting Engineer. Mr. Dowdy is President of the Haydn Myer Company, Birmingham, Alabama and headquarters in Montgomery, Alabama.

J. J. Finnigan, with headquarters at 722 Marietta St., N.W., Atlanta, Georgia is one of the country's leading fabricators of tanks, smokestacks, piping, water heaters, breeching and plate work. Branch offices are also maintained in Houston, Jacksonville, Dallas, Little Rock, Washington, New Orleans, Charlotte, Memphis and New York City.

Cleaver-Brooks Atlanta & Dallas

The General Sales Division of **Cleaver-Brooks Co.** has formed sales districts in Atlanta, Ga. and Dallas, Tex.

Frank R. Goulding, formerly of Penn Controls, heads the Atlanta area, while **R. E. Costin** manages the Dallas area.

Federal Pacific — East

The following series of executive promotions, reflecting expanded marketing activity in **Federal Pacific Electric Company's** Middle Atlantic Region, have been announced.

C. G. Landeck becomes Distributor Products Sales Manager for the region, with prime responsibility for apparatus sales to distributors and contractors. He was formerly Product Manager, Switch and Fusible Equipment.

George A. Bury moves up to Product Manager for Switch and Fusible Equipment, taking staff responsibility for sales and manufacture of this segment of the company line. Previously he was District Manager in Baltimore.

F. C. Karlson becomes Baltimore District Manager, reporting to Middle Atlantic Regional Manager H. E. Knudson.

A-C — Tex. & La.

Allis-Chalmers Manufacturing Co., Milwaukee, Wis., has announced the appointment of **Wholesale Electric Supply Company** of Houston, Texas as agency for Allis-Chalmers feed voltage regulators, power transformers, unit substations, switchgear, and circuit breakers.

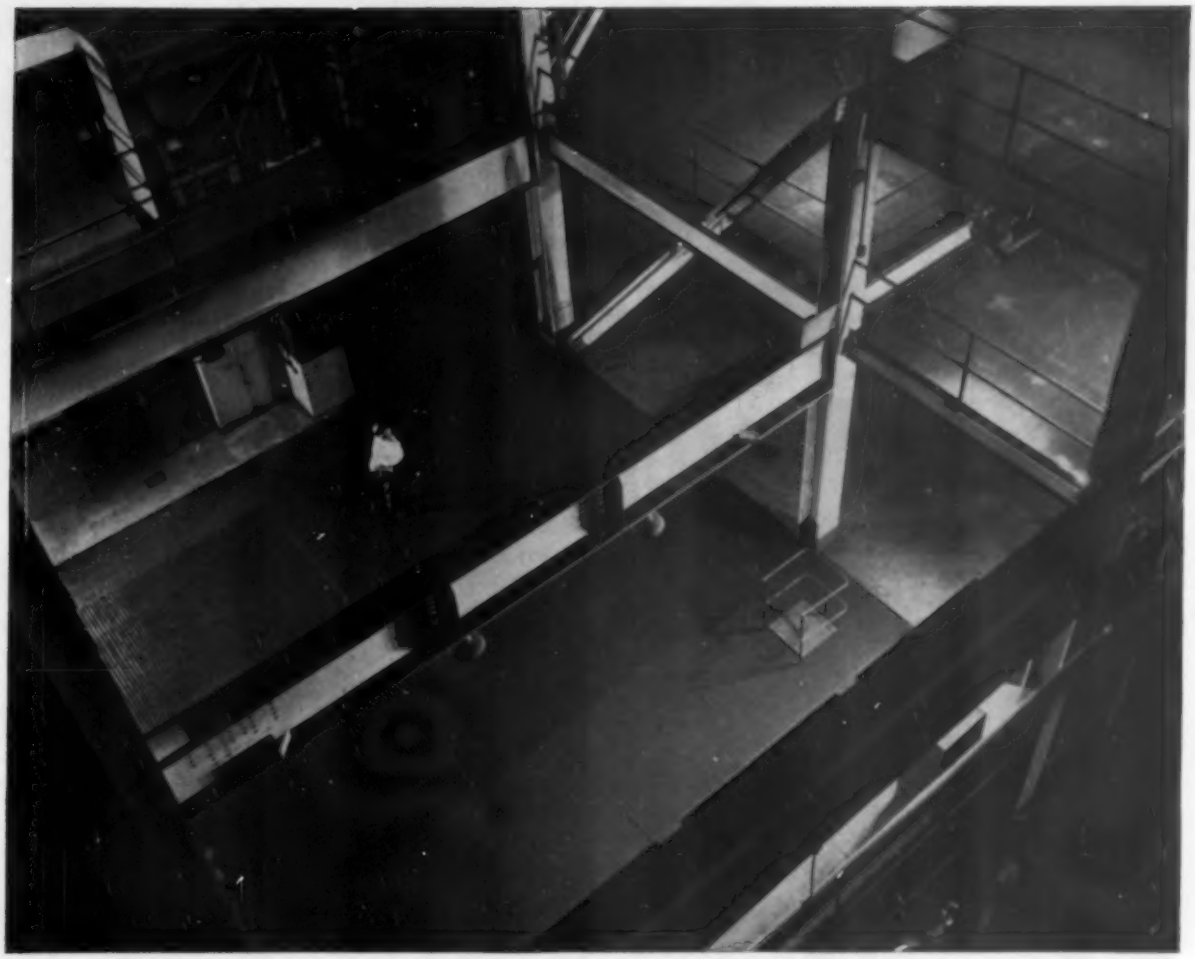
The firm, established in 1948, has been an authorized distributor of Allis-Chalmers motors and distribution transformers since 1949. Their sales manager is **Clyde G. Rutland**, and their sales office is located at 3821 McKinney Avenue in Houston.

Yale & Towne — Norfolk

S. L. Cooper Co., Washington, D. C. has announced the establishment of an industrial lift truck sales and service center for **Yale & Towne Mfg. Co.'s** Materials Handling Div. in **Norfolk, Virginia.**

The new Cooper installation, located at 411 W. 24th St., is under the direction of **H. W. "Pete" West**, a veteran of eight years experience in the industrial lift truck field in the Norfolk area.

Service facilities are in charge of **Charles Lewis**, formerly of the service department of the S. L. Cooper operation in Richmond.



Blaw-Knox Electroforged® Steel Grating provides removable floors to simplify plant operation

Floors and mezzanines made of Blaw-Knox grating solve the problem of reaching, moving and servicing the largest types of equipment. Sections come up easily, allowing ample space to maneuver and maintain any size of machinery. Costly, time-consuming alterations are virtually eliminated.

For increased plant safety Blaw-Knox Electroforged Steel Grating provides rigid one-piece construction for sure support of the heavy loads. Non-slip cross bars and a wide variety of bearing bars assure safe walking and climbing — even under the most hazardous working conditions.

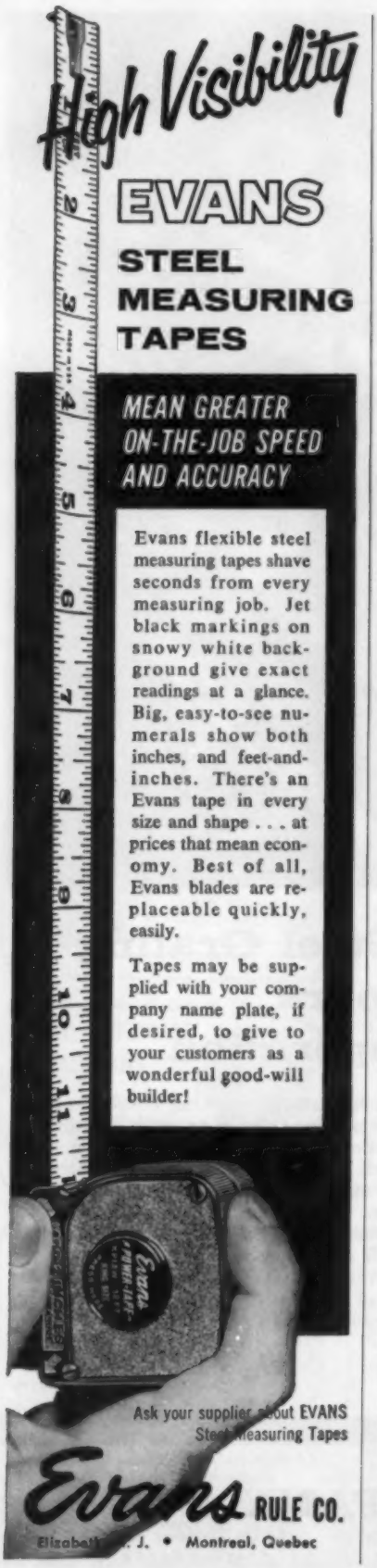
Because there's nothing to wear, or patch, nothing to catch and retain dirt, upkeep becomes easy and economical. And grating's maximum open area admits more air and light, makes brighter, better-ventilated plants.

Blaw-Knox Electroforged Steel Grating for walkways, stair treads and floors is fabricated to meet your specific operating needs. For new ideas about a complete line of space saving grating, write for Bulletin 2527 featuring grating and treads.

BLAW-KNOX

BLAW-KNOX COMPANY

Equipment Division
Dept. K, Pittsburgh 38, Pennsylvania


High Visibility
EVANS
STEEL
MEASURING
TAPES
MEAN GREATER
ON-THE-JOB SPEED
AND ACCURACY
Evans flexible steel measuring tapes shave seconds from every measuring job. Jet black markings on snowy white background give exact readings at a glance. Big, easy-to-see numerals show both inches, and feet-and-inches. There's an Evans tape in every size and shape . . . at prices that mean economy. Best of all, Evans blades are replaceable quickly, easily.
Tapes may be supplied with your company name plate, if desired, to give to your customers as a wonderful good-will builder!
Ask your supplier about EVANS Steel Measuring Tapes
Evans RULE CO.
Elizabeth, N. J. • Montreal, Quebec

Southern News Briefs (Continued)

sales representatives for Vanton's line of sealless plastic pumps and plastic valves, pipe and fittings.

The Halliday Company, with many years' experience selling process equipment for Southern Industry, will sell these Vanton products in the states of **Arkansas** and **Louisiana.** The Halliday offices covering those states are in Memphis and New Orleans respectively.

L. B. Foster — Dresser Distributor

L. B. Foster Company has been appointed an official distributor for Dresser couplings. The company will maintain large stocks of couplings for sale to contractors, mines, utilities, municipalities, and industrial users. Dresser couplings have wide application in any non-steam service, for gas, oil, chemical, and waterline installations.

L. B. Foster Company, suppliers of railroad trackage, steel sheet piling and pipe, maintain Southern district headquarters in Atlanta and Houston.

Librascope — Southwest

Librascope, Inc. has announced the appointment of **Wright Industrial Products** of Dallas and Houston, Texas as the representatives for Librascope computer and controls component products in the states of **Texas, Louisiana, Arkansas,** and **Oklahoma.**

Wright maintains an office at 5738 North Central Expressway, Dallas and 1803 Calumet, Houston 4, Texas.

Librascope, Inc. is a subsidiary of General Precision Equipment Corporation, New York.

Fisher Governor — Fla.

The **Jack M. Smither Company** in Atlanta, Fisher Governor sales representatives in Georgia and Florida, has opened a branch office in Jacksonville, Florida. This office will be staffed by **Dave Thomas,** who joined Smither in 1956, after eight years' experience in the instrumentation and control field.

Dayton Rubber — East & Southwest

Two new district managers have been appointed for **The Dayton Rubber Company's** Industrial Wholesaler Division.

Thomas Dunlap will cover **Maryland, Delaware,** eastern Pennsylvania and **Washington, D. C.** His headquarters will be in Philadelphia. He formerly was district manager in eastern Pennsylvania for the Dodge Manufacturing Corp., maker of heavy industrial power transmission equipment.

Harry Day, Jr., will cover eastern **Texas** and **Arkansas** with headquarters in Dallas. He formerly was a sales engineer for the Gardener-Denver Co., manufacturer of oil drilling and production equipment.

Kelite — Texas

Robert G. Hazel has been promoted to District Sales Manager with headquarters in Beaumont, Tex. by **Kelite Corporation,** manufacturer of industrial chemicals and steam cleaning equipment.

Mr. Hazel joined Kelite in February, 1957 as a sales engineer. Prior to that time, he served as a maintenance supervisor at the Port Arthur, Texas refinery of the Gulf Oil Co. In that position, he directed the work of all crafts in refinery maintenance, including the chemical cleaning of refinery equipment.

Southeastern Traveliers Club of Birmingham, Ala.

James M. Rooney, Abrasive Engineer with Bay State Abrasive Products Company's Birmingham office, is the new president of the recently organized **Southeastern Traveliers Club of Birmingham.**

Jim Phelps of United States Rubber Co. is vice president; **Roland Courtney** of The Harrington Co., secretary; and **Charlie Bostick,** Morse Twist Drill & Machine Co. is treasurer.

At the initial meeting in Birmingham, **Ken Adams,** manufacturers agent and president of the Southeastern Traveliers Club of Atlanta, outlined the activities of his club.

Resolite — Atlanta

Resolite Corporation, Zelienople, Pa., a leading U. S. manufacturer of structural plastic panel, has opened a new Southeastern regional sales office at 204 Fourteenth St., N. W., **Atlanta, Georgia.**

G. D. Griffin, who has had wide experience in the building trade, particularly in the field of fiberglass-plastic panels, has been appointed regional sales manager, in charge of the office.

Quaker Rubber — Texas

The Quaker Rubber Division, H. K. Porter Company, Inc., has announced the appointment of two Texas firms as stocking distributors of Quaker's industrial rubber products.

The **F. W. Heitmann Co.** of 1417 Kress St., Houston, will be Quaker's distributor in the Harris County area, and the **Jess McNeel Machinery Corporation** of 2215 N.W. Loop 13, San Antonio, will cover the San Antonio, Austin, West Texas and Rio Grand Valley areas.

Bendix Aviation — Southwest

Sales of Electro-Span digital supervisory control systems in the **Oklahoma, Kansas** and **Missouri** area will be handled by **J. A. Halpine & Son,** Tulsa, Oklahoma, according to the manufacturer, Pacific Division of **Bendix Aviation Corporation.**

The Halpines, J. A. (Art) and J. C. (Charlie), have offices at 603 Kennedy Bldg., Tulsa 3, Oklahoma. Telephone: GIbson 7-3488.

Associated Research — Fla.

A recent appointment by **Associated Research, Incorporated,** Chicago, Ill., manufacturer of electrical testing and measuring instruments, has made **Arthur H. Lynch and Associates, Inc.,** Engineering Sales Representative for the entire State of Florida.

Headquartered in Fort Myers, Florida, with branch offices in Miami and Gainesville, the Lynch company offers complete selling, servicing and calibration of electronic and nucleonic instruments.

IF IT'S EXPOSED TO RUST—
HAVE IT
HOT-DIP
GALVANIZED
BY
DIXISTEEL
TRADE MARK

In One of the South's Largest Hot-Dip Galvanizing Tanks

Double-dipping accommodates pieces up to 45 feet long

Add years of useful life to iron or steel. Give your products new sales appeal. Genuine hot dip galvanizing will do it.

Our new facilities have greatly increased our capacity and made it possible to hot dip galvanize much larger items. You get a more uniform, cleaner job; fast service.

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For more information, use Reply Card—Page 97

Southern News Briefs (Continued)

Gans Heads Va. Operation of Reynolds Aluminum Supply Co.

Walter J. Gans, Jr. is now Manager of the Richmond, Virginia warehouse operation of **Reynolds Aluminum Supply Company,** the South's largest combined industrial metals and building materials distributor.

He will direct sales and operations of the Company throughout Virginia, Washington, D. C. and portions of Maryland from the branch location at 1910 Petersburg Pike, Richmond.

Mr. Gans, a native of Richmond and a graduate of the University of Richmond and the Harvard Business School, joined Reynolds Aluminum Supply Company in 1955 as Advertising and Sales Promotion Manager. He had formerly been associated with the parent company, Reynolds Metals Company, for several years in various sales and sales promotion capacities.

Reynolds Aluminum Supply Company, headquartered in Atlanta, Georgia, also operates metals and building materials warehouse facilities in Atlanta, Savannah, Miami, Raleigh, Louisville, Memphis, Nashville, Birmingham and has a sales office in Jacksonville, Florida.

O'Brien Now Adv. Mgr. of Reynolds Aluminum Supply

E. W. O'Brien, Jr., for two years assistant to Walter J. Gans, Jr., has been appointed Advertising Manager of **Reynolds Aluminum Supply Company.**

O'Brien, a graduate of Oglethorpe University, will coordinate all Company advertising activities, both for its extensive warehousing system and for Southern States Containers, its Birmingham based drum division.

Vanton Pump — Ark. & La.

Vanton Pump & Equipment Corp. has announced the appointment of **The Alfred Halliday Co., Inc.,** as

LOOK FOR QUALITY
in your hot water generator...
look to FINNIGAN
Finnigan Hot Water Generators are engineered to give you large quantities of hot water for low operating cost. The finest materials, creative skill and quality construction assure efficiency in Finnigan equipment. These generators are fabricated from corrosive-resistant materials and contain copper removable-coil heating elements.
Before leaving the plant, each generator must conform to ASME, API, U. S. Government and other specifications. "Fabricated by Finnigan" is your assurance of quality.
Finnigan builds hot water generators to your specifications. Call, wire or write today for complete information with no obligation to you.
TANKS, SMOKESTACKS, PIPING, WATER HEATERS, BREECHING, PLATE WORK.
J.J. FINNIGAN CO., INC
722 Marietta St., N.W.
Atlanta, Georgia
P. O. Box 6025, Houston 6, Texas
P. O. Box 2527, Jacksonville 4, Fla.
4431 Maple Ave., Dallas 9, Texas
4106 C. St., Little Rock, Ark.
3714 14th St., N. W., Washington, D. C.
4054 Thalia Ave., New Orleans 25, La.
230 North Torrence St., Charlotte, N. C.
41 E. 42nd St., New York 17, N. Y.
5390 Laurie Lane, Memphis, Tenn.

Roger Martin — Yarnall-Waring Co.

Roger A. Martin, for many years representative for **Yarnall-Waring Company**, passed away in an Atlanta hospital May 14. He was particularly well known to industrial and utility engineers throughout the South and Southwest.

Mr. Martin was born in 1896 and is survived by his wife, Mary, and a step-daughter. He was graduated from Georgia Tech with a Mechanical Engineering degree.

He was employed by the Yarnall-Waring Co. as District Manager in Atlanta on September 1, 1929. During the period of his employment, the Atlanta District Office has grown from a one-man operation to its present complement of four men, including Mr. Martin.

Through his business position and professional affiliations, Mr. Martin acquired a host of personal friends with whom he maintained close contact. He was an active member of the American Society of Mechanical Engineers, and the Georgia Engineering Society.

Jeffrey Mfg. — Jacksonville

William A. Lewis has been named to take charge of the **Jacksonville, Florida** office of **Jeffrey Manufacturing Co.**

Mr. Lewis, who transfers from Houston, Tex., is a graduate of Purdue University.

B & W Elects New VP

Carl Claus has been elected a vice president of **The Babcock & Wilcox Company.**

Following graduation from Lehigh University, Mr. Claus joined B&W as an apprentice engineer in 1931. He became assistant superintendent of the company's former works in Bayonne, N. J., in 1937. The following year, he was made superintendent of the Refractories division plant in Augusta, Ga. He was advanced to executive assistant in charge of Refractories division sales and manufacturing in 1953 and was promoted to director of the Staff division three years ago.

Le Roi Sells to Waukesha

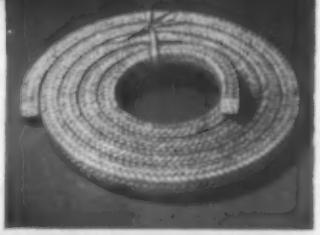
The Le Roi Division, an operating unit of Westinghouse Air Brake Company, Milwaukee, Wis., has announced the sale of the assets of its engine business to **Waukesha Motor Company**, Waukesha, Wis.

How will you have your TEFLON packing

BELMONT TEFLON* Packings—impervious to acids, caustics, oxidants, solvents, for long troublefree life in the most difficult service—are offered in a wide variety of forms to best suit each individual requirement. Select your needs from the *most complete line* and get *exactly* what you want. Your Belmont Packing Distributor is ready to serve you. Or write for Catalog T-57.

BRAIDED

Belmont braided Teflon yarn (No. 3085) and Teflon ribbon (No. 3055) are offered with the rugged mechanical structure of Belmont's unique CRISS-CROSS Braid that will not ravel, wear through, slough off. Each strand criss-crosses diagonally through the body of the packing, becoming an integral part of the whole. Supplied in coil, reel and ring form.



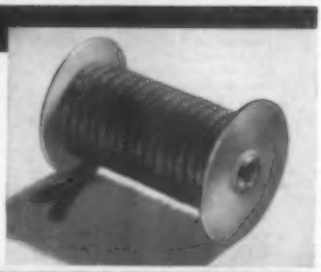
MOLDED

Belmont Pump Packing Rings, molded from shredded pure Teflon with Teflon suspensoid (No. 3062) and impregnated with graphite (No. 3061) serve the requirements for both non-contaminating and general purpose chemical pump service throughout the processing industries. Supplied in sets with solid Teflon spacers.

EXTRUDED

Belmont Extruded Teflon Packing (No. 3060-C) is shredded pure Teflon, impregnated with graphite and reinforced with a skeleton jacket of Teflon yarn. Available in reels and continuous lengths.

Belmont Bulk Packing (No. 3060-B) is shredded pure Teflon with graphite. Available in ½, 1 and 5-lb cans.



SOLID Rings

Belmont Solid Teflon Packings are offered in 3 designs—V-Rings (No. 3105), cup and cone (No. 3115) and wedge type (No. 3115-X). All provide a tight seal at low gland pressure and minimum friction on valve stem. Offered in sets, with square end adaptors where required.

**du Pont Trademark*

The Belmont Packing and Rubber Company • Butler & Sepviva Sts., Phila. 37, Pa.

BELMONT

Southern News Briefs (Continued)

Diamond Expansion Bolt

The establishment of a new branch office and warehouse under the management of **J. T. Cobb** at 2216 5th St., N.E., Washington, D. C., has been announced by the **Diamond Expansion Bolt Co., Inc.** of Garwood, N. J.

Diamond, manufacturers of an extensive line of masonry and hollow wall fasteners, masonry drills and telephone pole line hardware, will use the new office-warehouse to facilitate speedier service for the areas of **Maryland, Virginia, North Carolina** and the **District of Columbia.**

Sunbeam Lighting — Ga. & Ala.

Perry G. Sessoms, Jr., Atlanta, has been appointed Sales Representative for **Sunbeam Lighting Company** in the **Georgia-Alabama** area. Headquarters for the Sessoms organization is at 305 Techwood Drive, N. W., Atlanta 13, Georgia.

Mine Safety — Tenn.

Mine Safety Appliances Company, world's largest producer of approved safety equipment, has announced the appointment of **James C. Sheeham,** a native of Eufaula, Ala., as sales engineer at **Knoxville, Tenn.**

Air Filter — Kansas City

The appointment of **Air Filter Sales and Service Company,** Kansas City, Mo., as the sales and filter service representative for the Kansas City territory of the **Farr Company,** Los Angeles, internationally known manufacturer of air filtration equipment, has been announced.

The sales and service organization is a subsidiary of Air Filter Sales and Service Co., Inc., Farr's San Francisco representative for the past five years. **Jack Murphy,** formerly a sales engineer in the San Francisco office, has been named manager of the Kansas City operation.

Kent Co. — Ala.

McGlynn Candy and Paper Supply Company, Montgomery, Ala. has been appointed as a sales distributor for **The Kent Company, Inc.,** plant maintenance equipment manufacturer, Rome, N. Y.

George T. Davis, The Kent Company's Southern District Sales Manager is, here, demonstrating a Kent Quiet Triple Power Vacuum Cleaner, which can be used for a wet or dry cleaning job. Watching is **Harold McGlynn, Jr.,** Sales Manager, in charge of the company's chemical supply division.

McGlynn Candy and Paper Supply Company, owned by Harold McGlynn, Sr., an old established firm in Montgomery, handled until two years ago paper goods and candy. Harold, Jr., a graduate of Auburn University, started the company's janitorial division, which today handles a complete line of janitorial and swimming pool supplies.

Allis-Chalmers — La.

Lighting Fixture & Electric Supply Co., Inc., 307-311 Tchoupitoulas St., New Orleans, has been appointed an agency for **Allis-Chalmers Mfg. Co.'s** regulators and power transformers in New Orleans and vicinity.

Principals in the firm, which is a distributor for Allis-Chalmers distribution and instrument transformers, are **Charles G. Justic, Jr.,** president; **Claude P. Molaison,** secretary-treasurer, and **John J. Aertker, Jr.,** sales manager.

AIR ENGINEERING by NIAGARA

- AIR CONDITIONING with precise regulation of air temperature and air moisture for processing, for product drying, packing, storing, low temperature conversion, for testing and research.
- "NO FROST" REFRIGERATION for food and low temperature conversion, for testing and operations at extreme low temperatures; for moisture control below the freezing point of water.
- AFTER COOLING and air drying for large air and gas compressors and AIR LIQUEFACTION.
- COOLING ENGINES, COMPRESSORS, HYDRAULIC PRESSES.
- COOLING QUENCH BATHS, FURNACES, INERT ATMOSPHERES.
- COOLING ROLLS, WELDERS, DRAWING OR EXTRUSION DIES.
- PRODUCT AND PROCESS COOLING CHEMICALS OR INTERMEDIATES.
- COOLING LIQUIDS OR GASES IN CLOSED SYSTEMS.
- VAPOR CONDENSING UNDER VACUUM.
- REFRIGERANT CONDENSING.
- ELECTRONIC PROCESS COOLING.

You will reduce your costs, solve your problems of water supply or disposal and get HIGH OPERATIONAL EFFICIENCY with Niagara "Aero" Evaporative Heat Exchangers, After Coolers, Condensers, Air Conditioners or Coolers for these important plant services or processes.

Write for this Bulletin No. 135

High operational efficiency means: precise temperature for improved product and process quality control, heat removal at rate of input, simple operating conditions, real economy in upkeep, sustained full capacity. It means the lowest expense for up-keep.

Write for Bulletin 135

NIAGARA BLOWER COMPANY

Dept. SP-6, 405 Lexington Ave., New York 17, N. Y.

Niagara District Engineers in Principal Cities of U. S. and Canada

Western Gear — Southwest

The **G. R. Haley Company**, manufacturers' representatives with offices in **Tulsa, Oklahoma, Dallas** and **Houston, Texas** have been appointed to represent **Western Gear Corporation** of Los Angeles to sell speed reducers, pump drives, high speed units and special design assemblies produced by that company.

Western Gear Corporation operates a plant in Houston, Texas. The company is one of the largest manufacturers of mechanical power transmission equipment.

Houston Lighting & Power

Three top executives of **Houston Lighting & Power Company** have been advanced to new positions by the company's Board of Directors.

W. A. Parish, company President since November 1953, was named Chairman of the Board and Chief Executive Officer.

T. H. Wharton, Executive Vice President since 1953, was elevated to President of the Company.

P. H. Robinson was named Executive Vice President. He had served as Vice President in Charge of Operations since 1956.

Cooper-Bessemer — Mo.

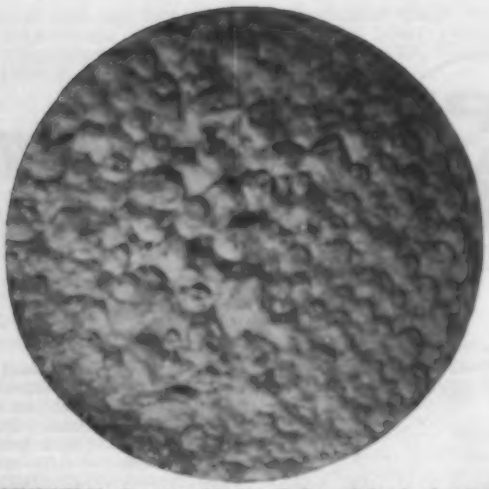
Robert L. Kietzman has been appointed Sales Engineer for the **Cooper-Bessemer Corp.'s** St. Louis Branch Office.

Working under the direction of F. J. Hunter, Branch Manager, Mr. Kietzman will be responsible for engineering and sales contacts with users of compressors and engines. He will work out of the Branch Office and Warehouse located at 1514 Locust Avenue, St. Louis 3, Missouri.

Philadelphia Gear Gets New Name

The Philadelphia Gear Works, Inc., sixty-six-year-old manufacturer of power transmission equipment, has changed its name to **Philadelphia Gear Corporation.**

In announcing the contemplated change, Russell C. Ball, company president, noted that the new corporate designation "more properly describes the company's activities in the mechanical power transmission field."



BEFORE CONCENTROL—Foaming of highly alkaline solution in glass test cylinder.

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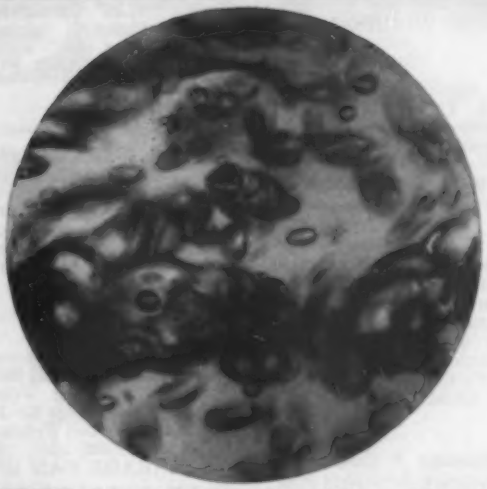

AFTER CONCENTROL—Same solution after addition of 12 ppm of Concentrol Antifoam.

Where boiler water carry-over is caused by foaming due to high alkalinity and high proportion of dissolved solids in the water, Concentrol provides a low cost, effective method of chemical treatment and control. Supplied in liquid, powder or briquet form—to be fed continuously or in slugs to boilers—Concentrol is essentially a surface agent that causes breakdown of bubble film to prevent foam formation. Formulations of Concentrol can include organic sludge conditioning agents and other water treatment chemicals for boiler treatment as well as antifoam. Fast acting and resistant to hydrolysis or breakdown under normal boiler temperatures and pressures. Eliminates need for costly pre-treatment of water and high blow-down rate.

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1—Package Boiler — New compact, low cost package unit (oil or gas fired) for small space requirements is described in Bulletin DK-1. Pressures to 325 psi, steam capacities to 45,000 lb/hr. — E. KEELER CO.

4—Steam Generators — Bulletin AXY - 1 describes auxiliary equipment and design features of the Amesteam Generator for sizes 10 through 600 hp and illustrates how this integrated design reduces cost and increases life and reliability. — AMES IRON WORKS, INC.

10—Stokers — Application & operation of A.E. Types "H" & "R" and Vibra-Grate stokers described in latest bulletins. Latter burns low grade fuels without smoke. No dust collectors necessary — AMERICAN ENGINEERING CO.

13—Power Plant Equipment — 12 page booklet No. 1022-B gives details on combustion and boiler feedwater control, pressure reducing, desuperheating and automatic soot blowing — retractable and rotary. — COPES - VULCAN DIVISION, BLAW-KNOX COMPANY.

40—Coal for Heating & Cooling — 16 page brochure describes boiler plant for heating and cooling the Hillside, Ill. Shopping Center. Drawings show the boilers and coal and ash-handling equipment. — BITUMINOUS COAL INSTITUTE.

50—Coal Crushers — Catalog 784-C describes single and double roll crushers, swing hammer pulverizers for all sizes of plants. — JEFFREY MANUFACTURING COMPANY.

76—Packaged Combustion — Gas, oil or combination packaged forced draft burner for either conventional or pressure firing of scotch marine boilers; larger sizes for water tube boilers; flame retention ring insures stable operation over full range; 13 sizes from 60 to 500 hp described in B13 literature. — THE WEBSTER ENGINEERING COMPANY.

81—Fly Ash and Dust Recovery — Engineering Booklet — Gives data and illustrations on the multiclone mechanical dust collector, showing basic principles and typical application for dust and fly ash recovery. — WESTERN PRECIPITATION CORP.

FANS—PUMPS—COMPRESSORS HEATERS—HEAT EXCHANGERS

104—Fans — Bulletins F-102 & F-200 describes Type "BL" and "BLH" fans offering high stability and efficiency for all classes of ventilation. Type "BLH" designed for high, broad efficiency curve on higher pressure jobs (6¾" water gauge and up). — BUFFALO FORGE COMPANY.

116—Air & Gas Compressors—Form 3132-A shows complete range of centrifugal and reciprocating units in process and chemical industries — for all pressures from deep vacuum up to 35,000 psi and capacities up to 165,000 cfm. — INGERSOLL-RAND COMPANY.

122—Industrial Fans — Bulletin 702 covers Type XL fans for air and material handling. Volumes to 130,000 cfm pressures to 18" SP. Catalog 855 describes Pressure Fans. Volumes to 12,000 cfm, 10" to 50" SP. — CLARAGE FAN CO.

135—Heat Exchanger — Bulletin 132 shows how sectional Aero unit gives close temperature control, saves labor, power, and water; design improves heat transfer to outdoor air by evaporation; 7,000,000 to 18,000,000 Btu/hr capacity range. —NIAGARA BLOWER COMPANY.

145—Multi-Stage Pumps — 4 page Catalog B-100 shows design and construction details, performance curves and metallurgical details of two types of pumps which are used for general water supply, boiler feeding, ice water & brine circulation, pneumatic water systems, sprinkling systems and a wide variety of clear-liquid uses. Heads range over 600 feet, capacities to 320 gpm. — C. H. WHEELER MFG. CO.

148—Hydraulic Pump-Motor — Bulletin 22 describes low-speed and high-torque units for industrial service. Can be direct-connected without speed reducers, thus conserving space. — GEO. D. ROPER CORP.

160—Boiler Feed Pumps—12 p Bulletin 122 describes and illustrates the type BFI high pressure pumps. Design features, service ratings and engineering data included.—PACIFIC PUMPS, INC.

189—Air Traps — Bulletin 289 describes ball float traps for draining water from air, gas or steam lines, or for draining light liquids from gas under pressure. Physical and selection data, prices, etc. — ARMSTRONG MACHINE WORKS.

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228—Fuel Cut-Outs & Water Level Alarms — Brochure D2 — Electrode type equipment for installation on water columns to provide fuel cut-out, high and low water level alarms and pump cut on and off. For pressures to 2500 psi. — RELIANCE GAUGE COLUMN CO.

241—Liquid Level Controllers — Catalog No. 405 illustrates and includes technical, instructive and descriptive information on the 12,000 Series variable-displacement type controllers. — MASON-NEILAN.

267—Remote Liquid Level Indicator — How clear, brilliant readings from any angle are possible with this unit is explained in Bulletin WG-1824. Pointer is always visible, even at extreme high and low water levels. Of manometric type with automatic temperature compensation. — YARNALL-WARING COMPANY.

268—Water Reducing Valve — Bulletin 553 describes how 50% greater capacity regulation is gained with Hi-Flo water pressure valve. Includes complete sizing data. — LESLIE CO.

PLANT EQUIPMENT—WELDING TOOLS—PROCESS SPECIALTIES

307—Condensate Drainage Control— Publication 6025 describes units for improving quality of heat transfer in process equipment through continuous return of condensate to boiler at high temperature and pressure. Lists many cases substantiating claim for increased heat transfer, more production with less fuel. — COCHRANE CORPORATION.

309—Elevated Steel Tanks — 16 p "Tank Talks" shows various types of tanks constructed and erected by manufacturer as well as stand pipes, reservoirs, storage and high pressure vessels, cylinders, etc. — R. D. COLE MANUFACTURING COMPANY.

317—Drier Compressed Air — Bulletin 130 shows how Aero After Cooler cools compressed air or gas below temperature of surrounding atmosphere; no further condensation in your air lines. Installed outdoors. Saves cooling water. Gives better operation of air-operated tools, etc. —NIAGARA BLOWER COMPANY.

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351—Grating & Treads — Bulletin 2527 describes electroforged, riveted, rectangular, diagonal, "U" and "T" types of interlocked grating and treads. Safe load tables and specification information. — BLAW-KNOX EQUIPMENT DIV.

386—Rigid Frame Buildings—8 page bulletin "Dixisteel Rigid Frame Buildings" — low cost, flexibility of design, durability, and minimum maintenance; also triangular or bow-string truss all-steel roof systems; fabricated for rapid erection. — ATLANTIC STEEL COMPANY.

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408—Wide-Range Valves — Data Sheet 10-5 covers the "Point 4 Factor Trim" — answer to those few types of applications where reduced capacity trim is desirable. Available in V-port and solid turned designs for double or single seated valves and in wide variety of material. — MASON-NEILAN DIV.

409—Lubricated Plug Valves—Catalog PV-4 covers operational features. Quarter-turn to open or close; lubricant grooves provide positive seal when valve is closed; when open, seating surfaces not exposed. — THE WM. POWELL COMPANY.

415—Steam Trap — Bulletin No. 455-B describes the Float-Thermostatic steam trap with its entire operating element in one unit making it removable without disturbing inlet and outlet connection to the semi-steel trap body, suitable for 125 psi steam pressure.—SARCO COMPANY, INC.

417—Welding Fittings — 192 page Cat. 54 gives design data on piping and piping application including digests of specifications, working pressures, design formulas, etc. Covers welding fittings, prefabricated pipe, forged steel flanges, and pipe coils. — MIDWEST PIPING COMPANY, INC.

430—Check Valve — Catalog 30A highlights the "tilting disc" check valve for handling fluids or gases under wide range of pressures. — THE CHAPMAN VALVE MFG. CO.

443—PVC Fittings & Flanges — Corrosion resistant polyvinyl chloride pipe fittings & flanges covered in 12 p catalog, featuring characteristics, advantages, limitations, operating pressures, temperatures, field tests, etc.—GRINNELL COMPANY, INC.

451—Aluminum Jacketing & Elbows — Folder J-1 describes aluminum protection for insulated lines, elbows, towers, vessels and tanks. Jacketing in 5 thicknesses, 2 alloys. Ell-Jacs in 60 sizes both for 90° and 45° ells. — CHILDERS MANUFACTURING CO.

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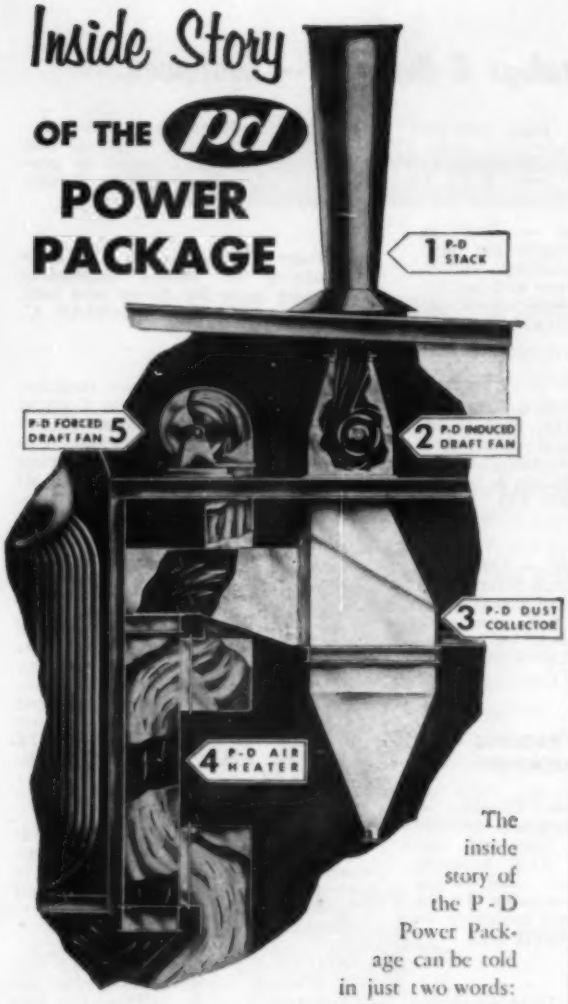

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511—Maintenance Ideas—"Genius at Work" — Contains ideas about plant maintenance, bits of philosophy, new products and a description of the company's line. — KANO LABORATORIES.

512—Lubricator Vacuum Type Pumping Unit — If your plant is experiencing difficulty with visibility and excessive maintenance on lubricator sight glasses, the new 82 vacuum pumping unit will offer lower cost. Form 1263 gives principle of operation and advantages.—MANZEL.

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584—Zinc Coatings — Bulletin describes Galvanox, a special zinc coating applied as a paint to provide galvanic protection to metals. — SUBOX, INC.

586—Tube Expanders — 120 page Catalog 88 covers expanders and repair tools for boiler and heat exchanger tubes. — THOMAS C. WILSON, INC.

594—Corrosion Control — Booklet, 20 pages — "Corrosion Control of Electric Light and Power Structures and Equipment" is designed to give company field operating men practical painting information on all phases of transmission and distribution work. Applicational photographs. — SUBOX, INC.

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596—Tube Cleaners — Mechanical units for boilers, condensers, evaporators and pipes described in Catalog 77A. Over 100 pages of air motors, cutting heads, drills, etc. — THOMAS C. WILSON, INC.

597—Facing Material provides superior sealing surface for mechanical seals — Data sheet describes the Dura Seal No. 55 Facing Material recommended for use in sealing all chemicals with exception of hot strong caustics and some fluorine compounds. — DURAMETALLIC CORPORATION.

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603—Monorail Case Studies — File F-1 — Offers 20 new studies of engineered monorail applications in various industries. Factual information, complete with photos and plain drawings. — AMERICAN MONORAIL CO.

610—Flexible Couplings — All metal couplings described in Catalog 51A have no wearing parts; offer freedom from backlash, torsional rigidity; free end float; smooth continuous drive; and visual inspection in operation. — THOMAS FLEXIBLE COUPLING CO.

619—Automatic Coal Scales — Bulletin O352A covers Model H-39 (capacities up to 40 tons/hr) auto-

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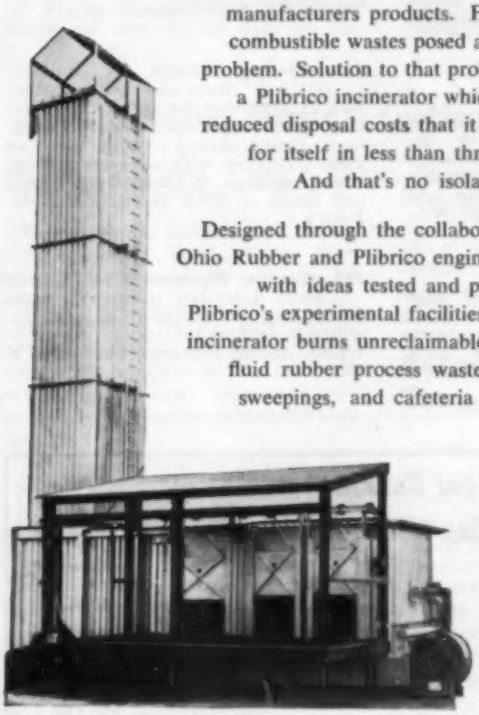

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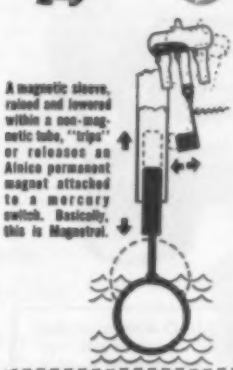
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Catalog (Continued)

matic coal scales. Coal never arches in feeder or weighing hopper — dust sealed; contact plate work of stainless steel. — RICHARDSON SCALE COMPANY.

630—Mechanical Vibrating Conveyors — Catalog 890 gives information on conveyability and density of typical solid materials and provides data on how to "Do It Yourself" to get required length. — JEFFREY MFG CO.

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702—Water Conditioning — Bulletin 611C, 20 p, describes manual & automatic softeners, zeolites and ion exchange resins, mixed-bed and multi-column deionizers, dealkalizers, ion exchange systems, filters & purifiers, and water treating chemicals. — ELGIN SOFTENER CORPORATION.

703—Air Conditioning — Bulletin 122 describes and illustrates operation and suggests applications for air conditioning method that controls humidity to 1% rh and temperature to 1 F (up to 140 F) with accuracy, independent of moisture sensitive instruments. — NIAGARA BLOWER CO.

706—Automatic Roof Cooling — Bulletin shows how automatic evaporative roof cooling can reduce inside temperature 8 to 15° without air conditioning; increase roof life; and reduce fire hazards. Many Southern installations. — APRIL SHOWERS — SOUTHERN.

710—Scale Remover—Bulletin shows how Anco Scale Remover quickly eliminates scale in boilers, water lines, refrigeration and air conditioning systems—ANDERSON CHEMICAL COMPANY.

712—Ion Exchange Equipment — Bulletin A-255 describes the various methods of ion exchange treatment which provide suitable boiler feedwater, process water, and purified solutions. — ILLINOIS WATER TREATMENT CO.

713—Electric Precipitators—26 page Bulletin 104 shows how units meet five engineering requirements — Positive control of gas flow; high, uniform electrode emission; Effective continuous cycle rapping; Simple, rugged construction; and Safe, trouble-free high voltage equipment. Gives 9 time-tested steps to a successful installation.—BUELL ENGINEERING COMPANY.

720—Power Roof Ventilator — 4 p Bulletin 550 illustrates and describes company's Centrilator, the centrifugal power roof ventilator with the exclusive "jet siphon." Includes capacity and dimension tables. — CLARAGE FAN CO.

721—What Type Collector?—Reprint 102 discusses control of industrial dusts and flyash and features P-D Collector Systems. — THE THERMIX CORPORATION

755—Cooling Tower — Bulletin DVAQ describes the double-flow Aquatower for industrial services involving intermediate-gallonages. Space saving line in wood or steel structure with asbestos cement board casing, in single or multi-cell units. — THE MARLEY COMPANY.

764—Cooling Equipment — Bulletin 80-D describes company's complete line of commercial and industrial equipment—operating principles, design features, etc.—FRICK CO.

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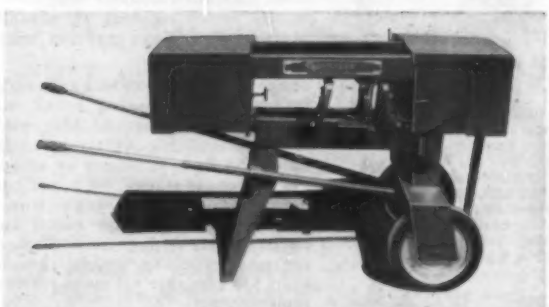

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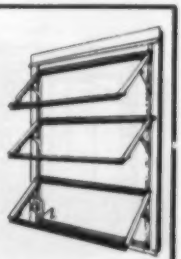

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801—Motors—Bulletin describes and catalogs more popular a-c motors from 1 to 600 hp, for every process and manufacturing requirement. Single phase and polyphase; surpass NEMA specifications. — BROOK MOTOR COMPANY.

802—Small Relays—Simple solenoid design with only one moving part described in Bulletin 700. Silver alloy contacts need no cleaning, filing, or other maintenance. — ALLEN-BRADLEY CO.

811—Electric Heat — "100 Ways to Apply Electric Heat" gives a wealth of informative data on the use of electric heat in industry — fast, uniform, dependable, backed by nation-wide engineering service. — EDWIN L. WIEGAND CO.

854—Adequate Wiring — Booklet "Wire Ahead" — Discusses preventive maintenance in electrical systems — the symptoms of inadequate wiring — and plans for anticipating electrical demands. — ANACONDA WIRE & CABLE COMPANY.

860—Capacitors — Correct power factor at the load. Bulletin PF-1150 describes self-contained capacitors in sizes from ½ to 15 kvar. No additional switches or fuses required. — SPRAGUE ELECTRIC COMPANY.

New Southern Plants — Continued from page 22

Tidewater Oil — Va.

Tidewater Oil Company is evaluating properties in the **South Norfolk, Virginia** area for a new oil terminal. Initial plans for the proposed terminal include five storage tanks, warehouse and office buildings, truck repair shop and tank car and barge facilities. Proposed expenditure runs between $500,000 and $600,000.

Terminal will be of modern design and automation will be applied in every way practical to permit the efficient storing and dispatching of Flying A products received from the Company's new Delaware Refinery, south of Wilmington.

Devoe & Raynolds Take Option on Houston Site

Devoe & Raynolds Company, Inc., Louisville, Ky., has exercised an option to purchase a nine-acre tract at **Houston, Texas,** as the possible site for a new manufacturing plant the company plans to build in the southwestern United States.

Devoe, a subsidiary of Merritt-Chapman & Scott Corporation, is one of the nation's major producers of paints, industrial finishes, and a wide range of plastics, chemicals and resins for coating manufacturers and other industries.

The nine-acre Houston site is located in the Mykawa area of the city immediately adjacent to the main line of the Atchison, Topeka & Santa Fe Railway.

Construction plans have not as yet been finalized, nor has the date been set on which to begin construction. Initial cost of the plant, land and equipment is estimated to be $1,000,000.

Expanded Plant for Texas Vitrified Pipe

Texas Vitrified Pipe Company, Mineral Wells, Texas is completing a remodeling and construction program that includes new manufacturing equipment and a revamp of the plant's power system.

A new Pearne & Lacy hydraulically-operated clay pipe press enables the company to produce its line of vitrified clay pipe in lengths up to 5 ft and in diameters up to 36-in.

New transformers and revamping of the plant's power system were also involved in the program since approximately 600 hp were added to the power load. Two 75 hp motors are required for the new automatic press.

Electronics Firm Moves to Carolina

After more than 30 years in Collingdale, Pa., the **Shallcross Manufacturing Company** has moved its entire manufacturing operation into a new 41,000 sq ft plant in **Selma, North Carolina.** Expanded office, engineering and manufacturing facilities will produce precision resistors, rotary switches, instruments and attenuators. **D. M. O'Halloran** is vice president of the company.

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FUTURE EVENTS of Engineering Interest

June 6: Public Utilities Accident Prevention Conference, Public Utilities Association of the Virginias, Hotel Roanoke, Roanoke, Va.

June 9-12: Material Handling Institute Exposition, Public Auditorium, Cleveland, Ohio. Clapp & Poliak, Inc., 341 Madison Avenue, New York 17, N. Y.

June 9-13: 4th International Automation Congress & Exposition, New York Coliseum, New York, N. Y. Harrison Gilmer, Dir. of Pub. Rel., 4th International Automation Congress & Exposition, 845 Ridge Ave., Pittsburgh 12, Pa.

June 15-19: Semi-Annual Meeting, American Society of Mechanical Engineers, Statler Hotel, Detroit, Mich.

June 23-25: Joint Meeting, American Society of Heating & Air-Conditioning Engineers, Inc. and American Society of Refrigerating Engineers, Hotel Leamington, Minneapolis, Minnesota.

Aug. 7-9: North Carolina Hospital Engineers Association, Inc., Annual Convention, Sir Walter Hotel, Raleigh, N. C. Henry W. Miller, Pres., NCHEA, Oteen, N. C.

Sept. 15-17: American Institute of Electrical Engineers, Petroleum Industry Conference, Baker Hotel, Dallas, Tex.

Sept. 15-17: Process Industries Conference, American Society of Mechanical Engineers, Statler Hotel, Buffalo, New York.

Sept. 18-21: 40th Annual Meeting, Public Utilities Association of the Virginias, Greenbrier Hotel, White Sulphur Springs, W. Va. R. W. McKinnon, Exec. Secy., PUAV, 602 First Federal Bldg., Roanoke, Va.

Sept. 28-Oct. 1: Power Conference, American Society of Mechanical Engineers, Statler Hotel, Boston, Mass.

Sept. 29-Oct. 3: American Society of Tool Engineers, Semi-Annual Meeting & Western Tool Show, Shrine Exposition Hall, Los Angeles, Calif.

Oct. 6-10: Southern Textile Exposition: Textile Hall Corp.; Textile Hall, Greenville, S. C. H. H. Lesesne, 434 Palmetto State Life Bldg., Columbia 1, S. C.

Oct. 9-10: 21st Annual Joint Solid Fuels Conference, ASME-AIME, Hotel Chamberlin, Old Point Comfort, Va. Carl S. Dennis, Chm., Va. Section, ASME, The Chesapeake & Ohio Railroad Co., Richmond, Va.

Oct. 13-15: National Electronics Conference, 14th Annual Forum on Electronic Research, Development, and Application, Hotel Sherman, Chicago, Ill. R. E. Hornacek, Pub. Committee Chairman, NEC, c/o Ill. Bell Telephone Co., 208 West Washington St., Chicago 6, Ill.

Oct. 14-16: 13th Annual Exposition, Society of Industrial Packaging & Materials Handling Engineers, Coliseum & Morrison Hotel, Chicago, Ill. G. Cornwall Spencer, 327 S. LaSalle St., Chicago 4, Ill.

Oct. 20-21: Southeastern Electric Exchange, Engineering & Operation Section, Hotel Roanoke, Roanoke, Va.

Nov. 4-8: 39th Annual National Metal Exposition & Congress, American Society for Metals, International Amphitheatre, Chicago, Ill. W. H. Eisenman, Secy., ASM, 7301 Euclid Ave., Cleveland 3, Ohio.

Dec. 1-3: Semi-Annual Meeting, American Society of Refrigerating Engineers, Hotel Roosevelt, New Orleans, La.

Dec. 1-5: 23rd National Exposition of Power & Mechanical Engineering, American Society of Mechanical Engineers, New York Coliseum, New York, N. Y. E. K. Stevens, Pres., International Exposition Co., 480 Lexington Ave., New York 17, N. Y.

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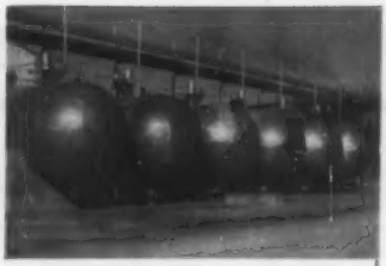

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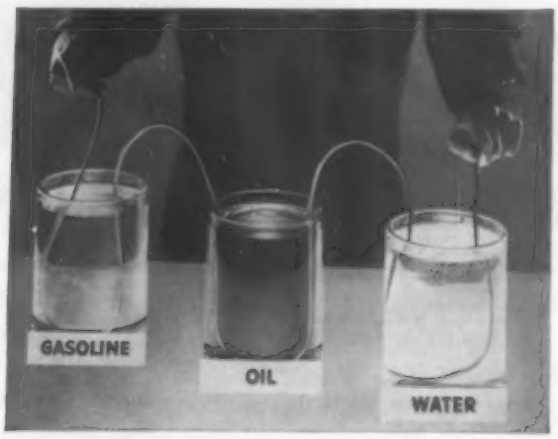

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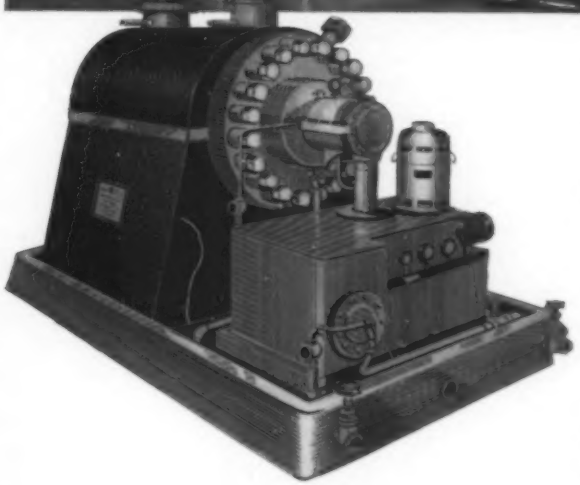

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